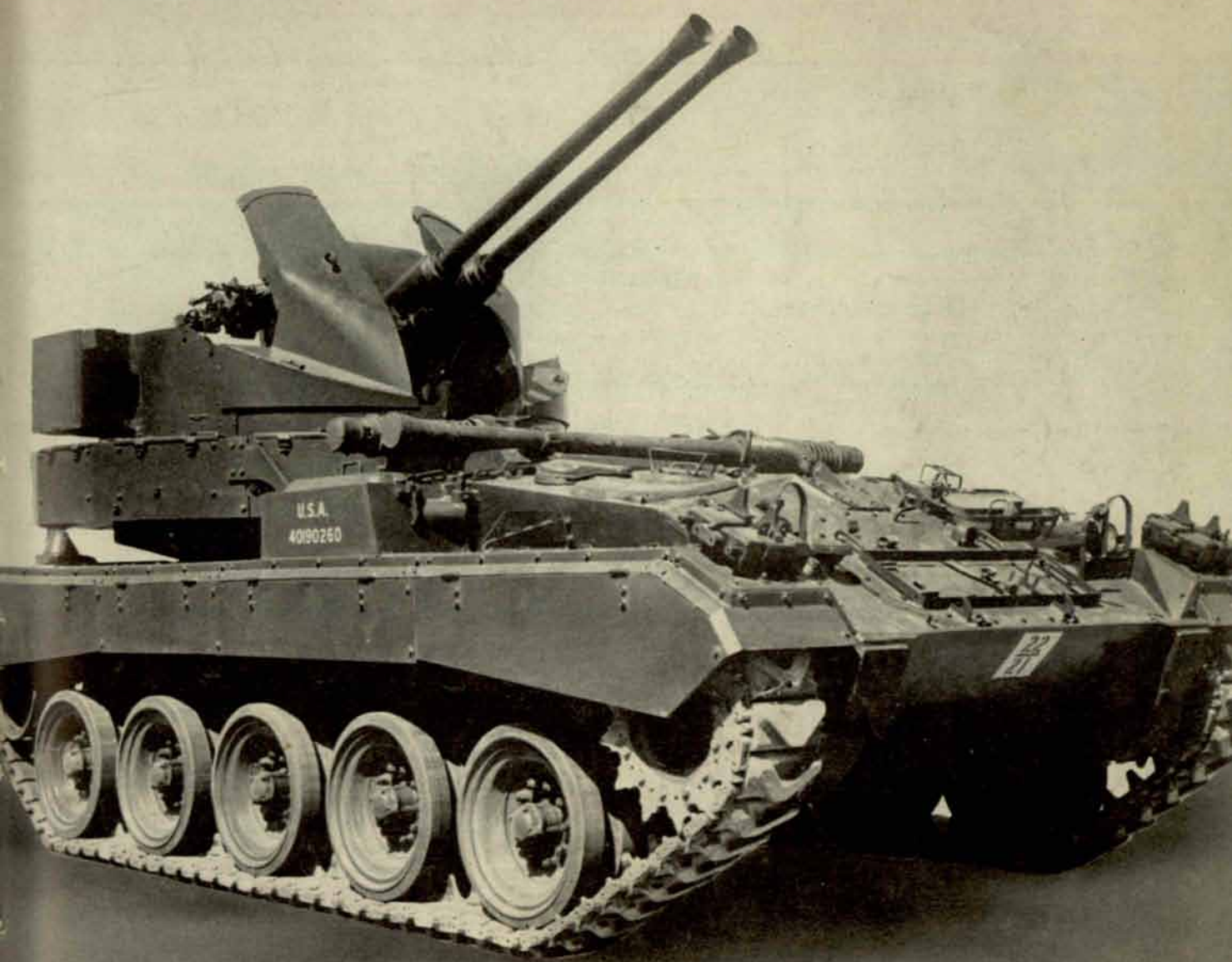


*Anti*aircraft JOURNAL

MAY-JUNE, 1950



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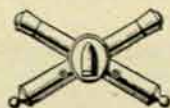
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CONTENTS

	Page
COVER: Twin 40mm Gun Motor Carriage M19.	
AAA AUTOMATIC WEAPONS IN CLOSE SUPPORT OF INFANTRY. By Lieutenant Colonel Dorsey E. McCrory, Inf.	2
ARTILLERY CONFERENCE.	9
ACK-ACK. By General Sir Frederick Pile	11
OCCUPATION HEADQUARTERS. By Captain W. L. Harrelson, GSC (Inf.)	15
EDITORIAL	20
ARTILLERY MISSIONS BY HIGH PERFORMANCE AIRCRAFT OBSERVERS. By Major Paul F. Wilson, FA	21
HONOR ROLL	24
CIVIL DEFENSE PLANNING. By Lieutenant Colonel Barnet W. Beers, GSC	25
STATUS OF TRAINING LITERATURE	28
THE NEW MAP GRID SYSTEM. Compiled by Major Donald D. Dunlop, Inf	29
ABOUT OUR AUTHORS	30
UNDERSEA WARFARE AND SEA POWER. By Rear Admiral C. B. Momsen, USN	31
AAA ACTIVITIES AT FORT CUSTER, MICHIGAN	34
AAA ACTIVITIES AT FORT ORD, CALIFORNIA	35
AAA ACTIVITIES AT FORT BENNING, GEORGIA	35
ENLISTED COURSES AT THE ARTILLERY SCHOOL	37
CAPTAIN JONES, WHAT IS YOUR PRIMARY ARMAMENT? By Captain Kenneth H. Hendron, CAC	43
NEWS AND COMMENT	44
COAST ARTILLERY ORDERS	47

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AAA Automatic Weapons

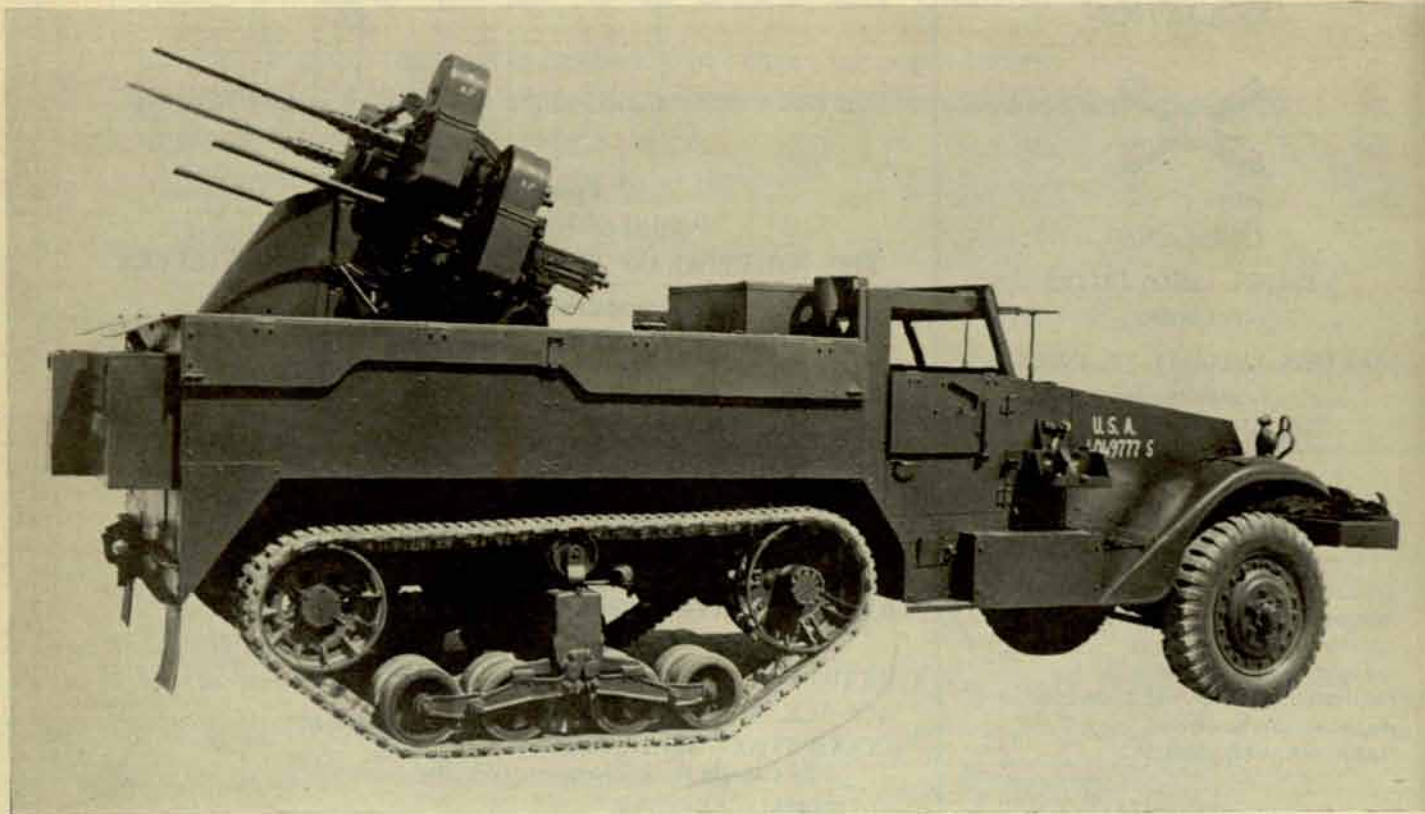


Figure 1. Multiple Gun Motor Carriage M16

The purpose of military training is success in combat. To a large degree that success is dependent upon how well we develop our teamwork, our cooperation and our coordination—in other words, how effectively we utilize every resource of combat available. Perhaps the thing that most clearly distinguishes an outstanding combat leader from the ordinary run-of-the-mill leader, which most of us are, is the fact that the outstanding one is never licked. No matter what situation he is confronted with, and at times his position may appear hopeless, he always comes up with a solution—somehow he manages to get the necessary equipment, the necessary men, the necessary weapons, or, more often, he more effectively utilizes the men, weapons and equipment which are available to him.

In spite of all that has been said through the years to the contrary, the infantry still remains the backbone of our fighting machine. But the infantry's task is hopeless unless it has the full and effective support of all the other combat Arms and Services. Perhaps the first support that infantry had on any large scale came from the field artillery, if we choose to call the tossing of a rock the origin of field artillery, a combination that developed into the infantry-artillery team with which we are all familiar.

Infantry first received support from tanks during World War I. Through the years we have developed not only the armored division but now have a tank battalion in the infantry division and a tank company in the infantry regi-

ment. During the last war there developed a very effective infantry-tank team or better still, infantry-artillery-tank team. At about the same time that tanks began to appear on the battlefield the airplane commenced its development as a factor in combat. So today we have very effective air support and the airborne division. At the present time a great deal of work is being done on air transportable divisions.

In the neighborhood of the doughboy on the battlefield in the last war appeared for the first time the AAA automatic weapons battalion with little thought being given to its ever being used for anything except destroying airplanes. But the war hadn't been under way very long before the doughboy got in a tight spot and called upon the AAA to help him out; which the AAA did with remarkable success. One of the first known cases on record of automatic weapons providing ground support was that provided by Battery "C," 209th AAA (AW) Battalion, on Roosevelt Ridge, New Guinea, on 13 August 1943. On 20 July American infantry encountered heavy resistance on Roosevelt Ridge. For 23 days, supported by field artillery, the infantry tried but the best it could do was to take the extreme west end of the ridge, suffering heavy casualties. The Japs were completely dug in and field artillery was not effective. On 13 August Battery C occupied positions for surface firing and at 1020 opened fire with seven 40mm guns and sixteen caliber .50 machine guns at a 1,400-yard range. When the fire was lifted after thirty-five minutes the in-

Close Support Of Infantry

By Lieutenant Colonel

Dorsey E. McCrory, Infantry

Infantry advanced along half the ridge before receiving enemy fire. The infantry halted and Battery C fired for 20 more minutes. When the fire was again lifted the infantry took the rest of the ridge without opposition and without a single casualty. The automatic weapons fire set the Japs on the ridge in panic and they withdrew leaving between 150 and 200 dead. Throughout the remainder of the war the value of automatic weapons for ground support became more and more recognized and resulted in more ground support missions. But we have only scratched the surface in obtaining the full value of automatic weapons in ground support, undoubtedly because too few of us are aware of their capabilities. To prove the point that they are most effective for ground support all that is necessary is to recall to memory the effectiveness of the German high explosive 20mm and his 40mm not to mention his 88's. The dough-boy ran into few tougher opponents.

The missions of AAA automatic weapons are: 1. To attack all forms of enemy aircraft and guided missiles within the capabilities of the weapons, to destroy them, to nullify their effectiveness or to force them to abandon their hostile missions; 2. To provide close support for infantry (armored) units by reinforcing the fires of infantry heavy weapons, and to attack and destroy targets of opportunity on land or on water.

The question might well arise, "When, under what condition and on whose authority, will automatic weapons be diverted from a mission of antiaircraft defense to a mission of close support of infantry?" The answer to the question is that the commander of a force to which these weapons are assigned or attached may employ all or a part of them for surface firing, even when there is a serious threat of enemy air attack, if by the employment of the weapons for surface firing the over-all mission of the force can be most successfully accomplished. A concept any less flexible not only unduly restricts the employment of the weapons but also unduly restricts a commander in his exercise of command. *The decision rests with the commander.* The weapons are just so many more weapons available to him and he not only can but should employ them against the target, either air or ground, which presents the greatest threat to the accomplishment of the mission of his command. It would be particularly foolish to do in the future as we have done in the past and allow available AAA automatic weapons, fully capable of surface firing, to sit around for days and weeks on end without firing a shot when the infantry is having a tough battle.

CAPABILITIES AND LIMITATIONS OF WEAPONS

Before proceeding to a consideration of tactical principles, the capabilities and limitations of automatic weapons in ground support should be considered. The M16 and M19 are the weapons organic to the infantry division, so the capabilities and limitations of these weapons will be the only ones considered.

The M16 has quadruple caliber .50 machine guns mounted on a half-track. The guns are very accurate and, as each barrel has an automatic rate of fire of between 400 and 500 rounds per minute, the combined rate of fire of the weapon is between 1600 and 2000 rounds per minute. This heavy volume of fire makes the weapon capable of destruction of point targets but at the same time there is sufficient dispersion for effective area fire. In addition, the half-track carriage of the M16 gives the weapon a fair amount of battlefield mobility.

The M16 is a large weapon with a high silhouette and, as there is little protection for its crew, it is quite vulnerable to enemy fire. The bed of the half-track is ¼-inch metal which protects the crew against fragmentation and a great majority of the small arms fire, but a direct fire weapon of caliber larger than caliber .30 will penetrate the metal. The M16 also has the inherent limitation of the half-track weapon, the dead space over the cab. Electrical stops prevent the weapons from being depressed sufficiently to fire on targets on the ground directly in front of the cab. This limitation may be overcome by backing the weapon into firing position, by digging in the front wheels or placing them in a depression in the ground.

An M19 has twin 40mm guns mounted on the M24 light tank chassis. The 40mm gun has a muzzle velocity of 2,800 feet per second which gives it good penetrating effect. Tests have shown that it will penetrate 16 inches of reinforced concrete at a range of 700 yards and 1½ inches of armor at a range of 500 yards. It is particularly suited for fire against light pillboxes, slits in pillboxes, sandbagged or earthen emplacements, emplacements in houses and wheeled and lightly armored vehicles. While the weapon is not capable of the destruction of pillboxes such as those found in the Siegfried Line with walls 6 feet thick, its extreme accuracy makes it suitable for neutralization of such pillboxes by placing accurate fire on their apertures, destroying their weapons and forcing them to button up. Their accuracy also makes the weapon very effective for the destruction of pin point targets such as caves. Each gun has

an automatic rate of fire of 120 rounds per minute which gives the weapon a combined rate of fire of 240 rounds per minute. This rate of fire, coupled with the weight of the projectile which is approximately 2 pounds, results in very destructive fire. The weapon has excellent battlefield mobility.

The M19, similar to the M16, presents a very large target with an extremely high silhouette and has limited crew protection, so it is very vulnerable to enemy fire. There are ¼-inch metal gun shields which provide the weapon and crew with some protection from the front against small arms fire and fragmentation. The 40mm gun is a flat trajectory fire weapon which within itself is not a serious limitation. The flat trajectory means that in order to hit a target the cannoneers must be able to see the target, and if the cannoneers can see the target the enemy in turn can see the weapon. This, and the fact that the weapon is an automatic weapon, the scourge of the battlefield, means that it is the weapon sure to draw enemy counterfire. There are methods of indirect fire with the 40mm gun but they are slow, cumbersome, inaccurate, wasteful of ammunition and not suitable for the fleeting type of targets usually encountered on the battlefield. The M19 has the added disadvantage of being noisy which is an inherent disadvantage of a full-track and to some extent a half-track weapon. There is probably nothing that better serves to alert the enemy and cause him to man his weapons than to hear full-track and half-track vehicles moving behind our lines.

The object in considering the capabilities and limitations of a weapon is to enable us to take maximum advantage of its capabilities and to take steps to offset its limitations. With the capabilities and limitations of the automatic weapons in mind, the tactical principles governing their employment may now be considered.

TACTICAL EMPLOYMENT

This article will discuss automatic weapons supporting an attack only, but it should be remembered that these weapons can be just as effectively employed for ground support in all the other combat operations such as defense, river crossing, withdrawal, delaying action, advance guard and flank guard. These weapons, with their mobility and fire power, are ideally suited for any type combat operation unless the terrain prevents exploitation of their mobility. At this point it should be made clear that none of these weapons employ effective antitank guns. The 40mm gun will penetrate only 1½ inches of armor at a range of 500 yards and all tanks, except very lightly armored ones, carry more armor than this. Should the weapon become engaged in a battle with a tank it would be at a decided disadvantage because the tank would have greater protection and would undoubtedly be mounting a heavier gun. It is only in self defense or against very lightly armored vehicles that automatic weapons are used as antitank guns. Even though the weapons are not effective antitank guns, they are most effective for supplementing antitank defenses, to engage enemy foot troops accompanying the tanks and to destroy the crews of disabled tanks who dismount and attempt to continue the fight on foot.

Next, what is meant by close support? It does not mean

that the weapon must or should be emplaced in the infantry front lines. On the contrary, because of our desire to obtain surprise and because these weapons are noisy and present a large target, we would not want them in the front lines. Generally speaking, the desirable area for emplacing these weapons is in the same general area with organic direct fire infantry supporting weapons. In ground support, AAA automatic weapons are employed in much the same manner as direct fire weapons of the infantry heavy weapons company. *What is meant by close support in this case is the emplacing of the weapons so as to enable them to deliver effective fire when and where the infantry wants it.*

The infantry division usually attacks or defends with two infantry regiments abreast. There are four firing batteries in the automatic weapons battalion. The desirable allocation of automatic weapons for close support of infantry is to attach for operational control a battery to each front line infantry regiment. Any additional batteries the division commander feels justified in employing for surface firing could be used for general support, for attachment to the regiment making the main attack, for employment with the division reserve when it is committed, or for relief of front line batteries for rehabilitation and maintenance purposes as dictated by the situation. The infantry regiment usually attacks or defends with two battalions abreast. As there are two platoons in the automatic weapons battery the desirable allocation is to attach a platoon to each front line battalion. There may be exceptions, such as when the battery should be employed in general support of the regiment, for example, in an attack when the regiment is making a flanking or enveloping movement supported by a base of fire.

For surface firing in close support of infantry the basic tactical unit is the automatic weapons platoon armed with four M19's and four M16's. The remainder of the discussion will be based upon a platoon which has been attached to an infantry battalion preparing to launch an attack. A logical sequence of events will be followed from the time the platoon leader is notified by his battery commander of the attachment through the first forward displacement.

Since it is the responsibility of the supporting unit to establish liaison with the supported unit, the first action of the platoon leader would be to contact the infantry battalion commander. He obtains from the battalion commander or his staff officers the enemy situation, the plan of action of the battalion and the support desired of the platoon. After securing this information the platoon leader makes a personal reconnaissance of the battalion front during which he formulates the platoon plan. For the platoon plan there are seven essential steps which the platoon leader must take in its preparation:

1. *Determine the exact dispositions of the infantry and the scheme of maneuver of the rifle companies.* In any plan of attack there are two main parts—the scheme of maneuver and the plan of fire support. The rifle companies constitute the maneuver element in the battalion while the platoon weapons become a part of the fire support element. Since fire support must be closely coordinated with and built around the scheme of maneuver, the platoon leader must know the infantry dispositions and their scheme of maneuver.

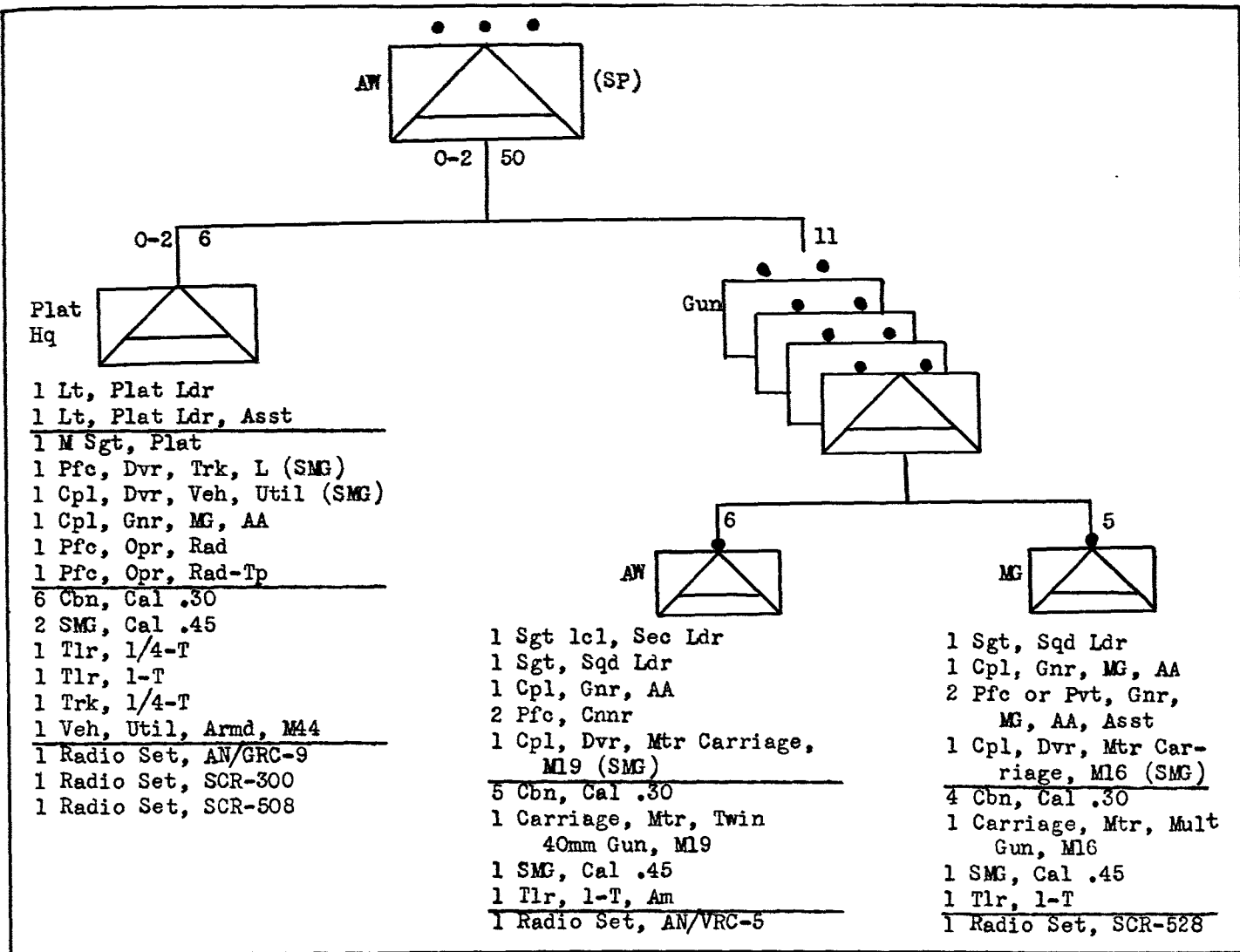


Figure 2. Chart of AW Platoon Organization

2. Determine from the infantry known and probable enemy targets. Keep in mind that probable targets are just as important as known ones. We make an effort in our army to set a trap for the enemy by holding the fires of our best sited and concealed automatic weapons until the enemy has advanced into the trap, at which time we open fire and attempt to massacre him. We can expect the enemy to attempt the same and must be particularly suspicious of suitable enemy positions even though there has been no indication of occupancy.

3. Select primary and alternate firing positions for each weapon. The platoon leader realizes that his weapons are sure to draw enemy counterfire, so he not only selects a primary firing position for each weapon but also an alternate firing position, i.e., a position to which it may move and continue its fire mission should the primary firing position become untenable. On occasion it may be necessary to select a supplementary firing position for all or some of the weapons, i.e., a position which enables a weapon to cover a field of fire separate and distinct from the field of fire which can be covered from the primary and alternate firing positions. Primary and alternate firing positions are a must, supplementary positions are selected when necessitated by the situation.

4. Select and mark routes to firing positions. There is nothing as useless on the battlefield as a supporting weapon which starts out to occupy a firing position to support an attack and fails to reach that position. The usual reason given is that the weapon got lost en route because routes either were not selected or were not adequately marked. Selection and marking of routes are particularly important when weapons are to occupy their firing positions during darkness or under conditions of poor visibility.

5. Plan forward displacement. Infantry never mounts an attack unless it expects to gain ground. The platoon leader realizes that his weapons have definite limitations as to range, that as the attack progresses, it will be necessary to displace his weapons forward to keep them within their effective ranges. He doesn't wait until time for displacement to start considering provisions for it. It would be very difficult in the middle of a fight to make a plan for displacement and even more difficult to get the plan to the weapon commanders, so the platoon leader always plans in advance the initial forward displacement.

6. Select routes for forward displacement. The platoon leader selects routes for the forward displacement of his weapons to coordinate the movement among themselves and with the movement of other elements on the battlefield.

This is necessary to prevent the weapons from bunching up and presenting a favorable enemy target, and to prevent them from attempting to utilize impassable routes.

7. *Select ammunition vehicle parks and routes of supply.* The platoon leader must not overlook provisions for the important item of ammunition supply of his platoon.

These are the major provisions of the platoon plan. Because coordinated fire support is of utmost importance, and as the infantry battalion commander is responsible for coordinating the fires of all weapons in support of his attack, the next logical step is for the platoon leader to submit his plan to the battalion commander for approval.

Following this, if they did not accompany him on his reconnaissance, the platoon leader should take his assistant platoon leader and key noncommissioned officers on a reconnaissance during which he thoroughly orients them on the ground concerning the general situation and the provisions of the platoon plan. Reconnaissance parties must be kept small to prevent alerting the enemy and drawing fire. If the platoon leader expects to secure the intelligent cooperation of all members of his platoon they too must be informed of the general situation and provisions of the platoon plan. After accomplishing all this the platoon leader is then ready to put his plan into execution.

Having considered the broad provisions of the platoon plan, some of the details under those provisions will now be discussed.

It has already been stated that firing positions for automatic weapons should be in the same general area with organic direct fire infantry supporting weapons. To enable the weapons to deliver supporting fire as long as possible without displacing they should be emplaced as far forward as possible so long as they are not unduly exposed in the occupation of their positions or brought into range of enemy small arms fire. To provide maximum cover, rear slopes and flanks of terrain features and depressions in the ground providing full defilade should be utilized. In flat and level terrain the weapon must be dug in and sandbagged as much as time will allow, and slit trenches must be provided for the weapon crew. Both the M19 and the M16 are large weapons; so a great deal of time and effort are required to completely dig them in. On the defensive this might be practical; however, on the offensive it will be necessary for the weapons to utilize natural positions afforded by the terrain, improved as much as time will allow.

For ground firing the caliber .50 machine gun has an effective range of 2,000 yards though a range over 1,000 yards is considered a long range. The effectiveness of its fire begins to decrease at ranges over 1,000 yards, primarily due to increased dispersion. The 40mm gun has an effective range well in excess of 2,000 yards but any range over 1,500 yards is considered a long range. The effectiveness of its fire begins to decrease at ranges over 1,500 yards, primarily due to difficulty of observation. Therefore, consistent with other requirements of a firing position, the M16 should be emplaced within 1,000 yards of the target area and the M19 within 1,500 yards of the target area. A good firing position, however, should not be sacrificed for a poor or mediocre one because of a few hundred yards of range as long as the weapon is kept within effective range.

Automatic weapons may be emplaced to fire over the heads of the infantry, from the flanks of or through gaps in the infantry line. If terrain will permit, overhead firing positions are by far the best as they allow for longer supporting fire as the infantry advances toward its objective and provide an unrestricted field of fire. Fire from overhead firing positions is also much safer to advancing friendly infantry than fire from its flanks or through gaps in its line; the overhead firing positions eliminate the possibility of the rifle troops unknowingly maneuvering into the field of fire of the weapons.

In an attack the infantry sets a series of successive objectives from the line of departure to the final objective, each of which is captured in a sustained drive. Initial firing positions should enable the weapons to place effective fire on the initial objective. Otherwise, the infantry is denied a portion of its supporting fires while supporting weapons are displacing forward. Other requirements of a firing position are a field of fire, cover, concealment, and a route into the position. A weapon position, particularly for an automatic weapon, which does not provide cover and concealment invites destruction. Overhead cover is most desirable and is most easily obtained by emplacing the weapon in buildings and in positions such as railroad underpasses.

In the interest of surprise, initial positions should be occupied as late as possible and still enable the weapons to be ready to fire at the prescribed time. If possible, movement into positions should be made during darkness and during artillery firings.

Work parties should prepare positions in advance, and should prepare range cards showing sectors of fire, known and probable targets and the ranges thereto.

Control of fire of the platoon should be retained by the platoon leader. He is expected to be the best qualified individual available to command and employ his unit. Firing of weapons can be best controlled and adjusted if done from the platoon command post. Centralized fire control enables the platoon leader to mass the fires of all or part of the weapons on a single target and yet retain the ability to engage separate targets if necessary. The weapons have sufficient range to mass their fires across a normal battalion front; the massed fires of the platoon can only be adequately described as awe-inspiring. There will be instances, such as when communications fail or weapons are emplaced over an extremely wide front, when control by the platoon leader will be ineffective or impossible. In such instances it will be necessary to decentralize control to section leaders or weapon commanders.

The initial targets for any close support weapon should be those which are likely to stop or hinder the advance of the attacking infantry as it moves forward toward its objective from the line of departure. The weapons which are most dangerous to the attacking infantry are enemy machine guns and other automatic weapons that are located so as to be able to sweep the ground over which the infantry must advance. The mission of direct fire supporting weapons is to destroy or neutralize enemy automatic weapons definitely located and to maintain neutralization as long as the safety of advancing infantry will permit. Entrenched enemy rifle

men are an important target but of second priority. Suspected enemy positions should be closely observed for activity.

It is the responsibility of the infantry battalion commander to establish priority of targets and to coordinate the engagement of targets by all supporting weapons in order to insure effective fire but to prevent duplication of fires. The automatic weapons platoon commander, after receiving the assignment of targets for his platoon, coordinates the fires of his platoon by assigning a sector of fire to each weapon. If frontage and the situation, such as number of targets, permits, 2 M16's and 2 M19's should be assigned the same sector of fire to provide volume of fire and continuity of fire as well as both caliber .50 and 40mm fire within the sector. After destroying or neutralizing assigned targets, a weapon commander engages targets of opportunity in his assigned sector of fire on his own initiative.

Fire of the platoon should be opened in time to permit destruction or neutralization of enemy weapons; the platoon weapons should be sited to sweep the ground over which the infantry must advance before it comes under effective fire of enemy weapons. Usually, therefore, fire will be opened before the infantry crosses the line of departure because the line of departure is placed as far forward as the infantry can advance without coming under the direct fire of enemy weapons. Exact time of opening fire is prescribed by the infantry battalion commander and is included in his attack order. In instances where the element of surprise outweighs the value of preparatory fire, fires of supporting weapons are withheld until the infantry crosses the line of departure and its attack is discovered by the enemy. If preparatory fires are to be fired, the automatic weapons platoon should not open fire over 10 minutes in advance of the attack unless it has a good reason for doing so. With the fire power available in the platoon, any reasonable fire missions can be accomplished in 10 minutes and to fire longer with the weapons in such forward areas will complicate the problem of ammunition supply to the weapons.

In his planning, the platoon leader must not overlook provisions for the important item of liaison and communications with the infantry. Being the supporting unit, it is his responsibility to establish liaison and communications with the infantry. Close coordination and cooperation are essential.

For purposes of command liaison it is recommended that the assistant platoon leader serve as liaison officer with the battalion commander. To insure maximum utilization of the fire power of the weapons, to prevent the platoon from being deluged with impractical or impossible fire requests and for adjustment and coordination of fires of the platoon weapons, a forward observer team with each of the attacking infantry companies is necessary. These teams must be improvised from personnel available in the platoon or from personnel made available by the automatic weapons battery or battalion commanders. To be effective they must be provided a means of communication with the platoon leader. There is one SCR 300 organic in the platoon. It is recommended that additional SCR 300's be borrowed from the infantry or from automatic weapons units not employed

on surface firing missions, for each of the forward observer teams.

While effective fire could undoubtedly be delivered by the platoon without the use of the forward observer system just described, big dividends will be realized therefrom.

When attacking infantry reaches the danger area of its supporting weapons fires, such fires must cease or be lifted to targets at a greater range or in areas not being utilized by the infantry. When supporting weapons are forced to lift their fires, the infantry launches its assault on the objective.

In order to maintain close and continuous support it becomes necessary to move supporting weapons forward as the attack progresses from objective to objective. In considering forward displacement, keep in mind that some fire support must be available at all times in case the infantry calls for it. Also keep in mind that the type of support needed differs with each situation depending upon the type of target presented by the enemy. Automatic weapons displace forward in two echelons with half of the weapons in each echelon.

Throughout an attack, depending upon the amount of enemy resistance, the attacking troops suffer a certain amount of disorganization. Leaders are killed or wounded, dead and wounded must be evacuated, units become intermingled and ammunition is depleted. This disorganization is aggravated during the assault phase of the attack so that when the assault troops overrun the objective the degree of disorganization is often quite serious. It is a critical and vulnerable period for the infantry. The enemy realizes this and if he has any reserves in the area he can be expected to counterattack rapidly. Supporting weapons should therefore plan forward displacement in advance and be ready to rapidly initiate fires on request.

While protection against enemy counterattack is the primary consideration in preplanned and rapid forward displacement of supporting weapons, the new positions should permit continuous support if the infantry continues its advance or if it is forced to withdraw.

Upon completion of the first forward displacement, subsequent action of the automatic weapons platoon to maintain continuous close support of the infantry is largely a repetition of prior actions, so the supply problem of the platoon will now be briefly considered.

COMBAT SUPPLY

Ammunition and messing are the primary supply problems of an automatic weapons platoon employed in close support of infantry. We trust that the platoon has been fed regularly and daily throughout combat so that the messing of the platoon should present no new nor particular problem. The automatic weapons battery has personnel and equipment for feeding its personnel and should continue to do so as long as possible regardless of the employment of its platoons. On the other hand, if it would be more convenient, due to the employment of a platoon, to attach it to a company of the infantry battalion for messing, there is certainly no objection. Perhaps the heavy weapons company would be the logical company to which to attach the platoon.

In the war of the future we can expect to conduct operations day and night, 24 hours a day. This will increase the difficulty of keeping weapons fully supplied with ammunition. The basic load of ammunition for the M19 is 720 rounds; the basic load for the M16 is 7,200 rounds. The ammunition is heavy and weapons crews are small. At their maximum rate of fire the weapons can expend their basic load in a few minutes. For antiaircraft firing purposes, where enemy planes are within range for only a few seconds, the basic load of ammunition with the weapons is sufficient, and of course it is far easier to supply weapons with ammunition in antiaircraft positions than in front line positions. For these reasons it is apparent that ammunition supply of the weapons when employed on close support missions is a difficult problem, particularly if the fighting is heavy and sustained. How can the problem be solved?

In the first place, so that the ammunition supply vehicles will be where the ammunition bearers expect them, there must be definite routes of supply and definitely prescribed ammunition vehicle parks. When an ammunition vehicle is emptied or nearly so it must be immediately dispatched to the ammunition supply point for a new load. Although it would be desirable, it is doubtful that the ammunition vehicles will be able to supply the weapons in their firing positions so that ammunition carrying parties and shuttling with ¼-ton truck will usually be necessary. Such conventional battlefield expedients may be adopted but during periods of heavy fighting it is doubtful that they will be sufficient. During such periods it will be necessary for the

platoon leader to estimate, based on his experience, the length of preparatory fires, rates of fire, the number and nature of enemy targets, the estimated duration of the attack, and to arrive at the amount of ammunition to be expended by the weapons in each firing position and to place that amount of extra ammunition at each firing position.

Ammunition supply vehicles should be obtained from the ammunition section of the automatic weapons battalion headquarters battery, supplemented by vehicles from other sources where necessary. These vehicles and their personnel can expect casualties in this mission but nevertheless, the weapons are useless without ammunition, and must be kept fully supplied.

SUMMARY

AAA automatic weapons organic to the infantry division have many outstanding capabilities in close support of infantry, particularly their extreme accuracy and terrific volume of fire. They, like any other weapons, have limitations, the most serious being the large target they present and their vulnerability to enemy fire. These limitations can only be overcome through intelligent selection, preparation and occupation of firing positions. The employment of the weapons is no longer restricted by a primary mission of anti-aircraft defense and a secondary mission of ground support. Automatic weapons have conclusively proven, in combat, that they are most capable of supporting the infantryman in his battle on the ground. There is no weapon organic to infantry units which can match their firepower.



43 West Pointers To CAC

The following named members of the 1950 graduating class of the United States Military Academy are being commissioned in the Coast Artillery Corps:

William S. Howe	Louis G. Hergert, Jr.
William H. Mieke, Jr.	Dan R. McDaniel
William A. Pogue	John R. Gaffney
John M. Cragin	Robert J. Lunn
Edward J. Gradoville	Henry D. Spielman
Blair A. Ross, Jr.	Warner T. Bonfoey
John E. O'Brien	Clarence J. Matthiessen
Andy J. Byers	Vernon R. Gatley, Jr.
Fred E. Nickerson	Richard A. Rein
Philo A. Hutcheson	Fredric W. Haberman

Peter A. Abbruzzese	George C. Fifield
Robert C. Morrison	John E. Miller
Thomas C. Sharp, Jr.	Charles H. Bell
Robert B. Peltz	James D. Michel
Lilbern B. Roberts	Stanley M. Prouty, Jr.
William Robert Daniel Jones	Durward S. Wilson, Jr.
Charles C. Cunningham	James R. Mitcham, Jr.
Donald L. Bohn	Milo D. Rowell
Jordan R. Seitz	Paul S. Vanture
Charles F. Means	John F. Irwin
Rudolph V. Cosentino	Thomas H. Ball
Henry A. Gilbert	

The Artillery Conference

The Army's first integrated Artillery Conference was held at Fort Bliss, Texas, from 8 May to 12 May, inclusive. Among the more than 250 officers attending, were officers who are to serve as instructors for the ROTC, National Guard and Organized Reserve Corps; and representatives from the U. S. Navy, U. S. Air Force, Marine Corps, the six Armies of the United States, Department of the Army, Office of the Chief of Army Field Forces, AFF Boards, the technical Services, and several Allied Countries. The purpose of the Conference was to brief the conferees on the latest doctrines and developments in guided missiles, anti-aircraft artillery and field artillery.

The Conference was opened by Major General A. M. Harper, Commandant of The Artillery School. Major General John L. Homer, Commandant of the AA & GM Branch of The Artillery School, and Commanding General, Fort Bliss, Texas, welcomed the visitors to the Post. Distinguished visitors included Honorable Archibald S. Alexander, Under Secretary of the Army; Mr. William Webster, Chairman of the Research and Development Board of the National Military Establishment; Lieutenant General Thomas B. Larkin, Assistant Chief of Staff, G-4; Major General W. W. Irvine, Army Liaison Officer, Headquarters Continental Air Command; Major General Shoesmith, British Army; Brigadier General S. R. Mickelsen, Chief, Guided Missiles Group, P & O Division, Department of the Army; Brigadier General Rene Duperon, Commandant of the French AA Firing School, Nimes, France; Brigadier General Bryan L. Milburn, Chief of

Staff, The AA & GM Center; Brigadier General Paul W. Rutledge, Commanding General 34th AAA Brigade, Fort Bliss, Texas; Colonel H. N. Toftoy, Chief, Rocket Branch, Research and Development Division, Office, Chief of Ordnance; and Lieutenant Colonel N. B. Holt, British Liaison Officer, The AA & GM Branch, The Artillery School. Among the other visitors were Major General K. D. Nichols, Brigadier General H. B. Loper, and Brigadier General George J. Nold.

A discussion of guided missiles was given by Captain Dale Denman, Jr. and Captain Nels A. Parsons, Jr. Employment of guided missiles was covered by Lieutenant Colonel T. S. Rodgers and Lieutenant Colonel Milford Wood. Colonel L. W. Byers, Director of the Guided Missiles Department, was in charge of the displays of guided missiles and related equipment.

Colonel Francis B. Kane, Director of the Gunnery Department, was in charge of the AAA firing demonstrations. They consisted of both heavy and light AAA firings at Hueco Range. The 71st AAA Gun Battalion, Lieutenant Colonel Clair M. Worthy, commanding, fired the 120mm guns; the 67th AAA Gun Battalion, Lieutenant Colonel I. J. Dalrymple, commanding, fired the 90s; and the 59th AAA AW Battalion (SP), Lieutenant Colonel Landon W. Witt, commanding, fired the 40s.

Talks on air defense were given by Lieutenant Colonel C. G. Hanson and Captain D. L. Ducey, and a discussion of air transportability and future developments was given by Lieutenant Colonel John P. Connor, AFF Board Num-



The 240mm Howitzer (SP) was a part of the Field Artillery phase of the demonstration.



Visitors inspect the Guided Missiles exhibit at Bliss.

ber 1. Included also, were talks on future trends and developments in communications and on the support of civilian components.

A demonstration of massed AAA and field artillery firings was conducted at the Dona Ana Range. Field Artillery units from Fort Sill participating in the demonstration were: 2d Field Artillery Battalion (Rocket), 17th FA Battalion, 18th FA Battalion, 6th Armored FA Battalion and 1st Observation Battalion. These units were assisted by representatives from the Air Training Battalion and the Department of Matériel, The Artillery School, Fort Sill, Oklahoma. The 2d FA Battalion, Lieutenant Colonel Sydney E. Sacerdote, commanding, demonstrated the use of 240mm howitzers and 4.5 inch rockets.

A demonstration of AAA automatic weapons in close support of infantry was conducted at the Castner Range.

The Conference included a visit to the 1st Guided Missile Group, Colonel Ovid T. Forman, commanding, and White Sands Proving Ground, New Mexico, Colonel G. G. Eddy, commanding.

Under the supervision of Brigadier General J. D. Balmer, Assistant Commandant of the AA & GM Branch, TAS, a general discussion period concluded the program.



120mm gun firing was a feature of the program.

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By Sir Frederick Pile, G.C.B., D.S.O., M.C.

(Through trial and error, the development of AAA was forged in the crucial air battles over Great Britain. The early failures and the ultimate successes of the British AAA contributed directly to the subsequent achievements of American antiaircraft artillery.)

Replete with lessons learned, the book points continuously to the folly of an inadequate antiaircraft defense in the face of a powerful enemy capable of raining destruction from the skies.—EDITOR.)

PRELUDE TO WAR

The Higher Command of the Army in 1937 had no doubt that war was on its way, and, though England was still to go through the period of Munich, they were uneasy. But money was scarce, and while there was a lot of talk about rearmament and about the form of the modern army, not a great deal was done. There was talk of an armored division, for command of which I was one of the runners, and would have liked the appointment, but there was considerable doubt as to whether we could afford armored divisions and antiaircraft units all at the same time. In the autumn of 1937 I was sent for by Mr. Hore-Belisha, who was then Secretary for War, and was offered command of the 1st A.A. Division. I knew little or nothing about antiaircraft, but was assured by the Secretary of State that it was the most important job in the Army at the moment, so I told him I would take it on and do my best.

The headquarters of the 1st A.A. Division were at Uxbridge, alongside the Air Force. We were housed in the most dismal huts, and on my first visit I realized that whatever the importance the Secretary of State had ascribed to A.A. that importance certainly had not percolated through to my new headquarters. I was met by my G2, Major Reynolds (now Major-General Reynolds), and in a few bitter words he disillusioned me. It appeared that the 1st Division, far from being in a position to engage the enemy, was hopelessly undermanned and underequipped. Even to mention the word equipment was a misnomer—there was practically none.

*Reprinted, with permission, from ACK-ACK, published by George G. Harrap & Co., Ltd., London, England.

My first task was to try to raise units to something approaching their proper establishment. Nobody was terribly interested, and it was generally left to the C.O.s of the regiments to do the best they could to obtain recruits. It is difficult to calculate from how many platforms my staff and I harangued mostly unresponsive members of the population and tried to persuade them to join the A.A. Six nights a week we were all out at various drill-halls meeting such of the command as happened to turn up. Attendance in the drill-hall on any one night, including the permanent staff, rarely exceeded twenty, but even for this twenty there was too little equipment on which to train them. The drill-halls, such as they were, had been built many years before, and were more suited to an army based on horse transport than an army which was trying to train itself for the task of engaging the high-flying airplane. There was also a legacy from the previous war, in which the A.A. had been regarded as an embusqué job.

Spring and summer of 1938 saw us at practice camp, and what a show it was! It was during these camps that I coined the phrase which, I am sorry to say, remained with me until the end of the War—"Below and behind." Whenever we fired a salvo there were many more shells below and behind than there were above. Of course, the predictors and height finders were supposed to put us on the mark, but it was not until we had eliminated every human factor—and that did not happen until towards the end of the War—that the mean point of impact was on the target, and not "below and behind." In those days even the practiced gunner was inclined to let his pointer lag a little behind, and those who were not so practiced were almost invariably behind the control pointer. The gunners were equipped with the same predictor that we had in 1918—a predictor that needed six operators, all of the highest possible skill—and the old 3-in. gun, which had a muzzle velocity far too low for any hope of taking on a modern airplane.

Then in the autumn of '38 came Munich. We were hustled out into action, and what a period it was! The Government really thought that war might happen at any minute. Munich today is decried by all as unworthy of our country. I was delighted when Mr. Chamberlain came

A MESSAGE FROM THE AUTHOR

It is with the greatest pleasure I send my greetings to the many American soldiers, friends of mine, who served in the Antiaircraft branch of the American Army. I remember with pride their excellent services alongside our own troops in the defense of London and in the notable victory over the flying bombs. May all my old comrades long flourish exceedingly.

General Sir Frederick Pile.

back from Munich with a temporary peace. I felt—and, indeed, told all my division—that Munich was a Godsend. If in the next year we could not get our establishment up to strength, train on such equipment as we had, and bully all and sundry for better equipment, then we were not worth our salt. Munich made recruiting go with a swing. For the first time we began to have strings of men coming up to the office asking if they could join, instead of our having to go and beseech them to come in. Our drill-halls were full as I had never seen them before, and there was even a small trickle of new equipment. And so for practically a year we strove as best we could to learn our trade.

AAA MISSION

The Committee came to certain conclusions on the role to be played by AA guns. They were (1) to destroy hostile aircraft; (2) to cooperate with fighter aircraft by disorganizing enemy formations so that our fighters might engage them with the best possible chance of success, and by indicating the position of enemy aircraft by shell-burst; and (3) to deny to hostile aircraft opportunities of detailed observation and accurate bombing by forcing them to fly high and alter course at critical moments.

The Government was not so optimistic about these conclusions, and it was announced publicly that “the bomber will always get through.” However, the report did, for the first time in history, allot to antiaircraft guns a destructive role instead of insisting on the primary importance of moral effect.

It is not without interest that this emphasis which, since the early days of the First World War, had been placed on the small lethal effect of antiaircraft fire misled everyone into thinking of antiaircraft defense as a negative rather than a positive defense. This, in spite of AA Command's many successes, held true until the advent of the flying-bomb, which had no pilot to frighten. For the first time lethal effect was essential. During those months of flying-bomb attacks, the success which the gunners achieved in destroying the bombs at last altered the whole negative conception of antiaircraft defense, and must be a fundamental factor in any organization for the air defense of this country.

Recruiting was still a very slow business, and, as there was only a small amount of drill-hall accommodation, and the training equipment was both inadequate and often out of action, this was not surprising. New buildings had been approved in 1935, but not a brick had yet been laid. Captain Liddell Hart, in his book *The Defence of Britain*, points out that, at that time, the General Staff were more concerned with equipping an expeditionary force than in protecting the bases from which it must set forth. It was even alleged that in high places they began to talk about money for antiaircraft home defense as if it were money taken away from the Army. It was at this moment that Germany announced that the Luftwaffe expansion was proceeding according to plan: equality with France being now achieved, the Third Reich intended parity with the Russian Air Force.

I have often thought since those days how very strangely are War Office appointments made. Not that anyone who

was given appointment in connection with A.A. could fail to observe what a terrible state the air defense of the country was in after years of Treasury neglect and public apathy. We were all appalled at the fool's paradise in which the people of this country were living, and particularly the people of London. In May 1938 I got my first opportunity of telling the people responsible just what I thought.

Colonel H. L. Nathan, M.P., was my host at a dinner given at the House of Commons, and, after a few remarks about the obvious desirability of London as an object for enemy attack, I gave the assembled guests as serious a warning as I could about our shortages in general and our shortage of training material in particular. I told them that not only was our equipment inadequate to defend the country, both in quantity and quality, but it was inadequate even to train the troops.

“We haven't got any extra equipment,” I told them, “and if we had we couldn't fit it into the drill-halls, and our permanent staff instructors are necessarily limited. . . . Those recruits that come in, full of enthusiasm, must feel stunned and rather wonder what it is all about when they find they are packed into a squad of, shall we say, thirty men, some distance away from the piece of equipment they are supposed to be operating, and seeing very little training in the two hours or one hour of the evening at their disposal.”

In August 1938 both A.A. Divisions took part in a Home Defense exercise. Some 800 searchlights were manned around London and as far north as Lincolnshire, and my own Division provided, in addition, skeleton detachments for thirty-four gun stations which were among the comparatively few actually in communication with an Operations Room. We provided just sufficient men, in fact, for the control rooms and instruments. We learned a great deal from this exercise about how depressingly bad we were, particularly in the tactical control of our guns. Also our aircraft recognition was insufficiently good to identify friend from foe before the target disappeared out of range. As for the searchlights, the weather was such that nothing new was learned about them at all.

Just over a month after these exercises our defense was given a much more severe testing. At half-past two in the afternoon of September 23 the antiaircraft defenses of the Territorial Army were ordered to deploy for the emergency that was to become known as the Munich Crisis.

The men were warned by telegram, telephone, and by personal visits from key-men who had been assembled. The order reached them all over the place—in their homes, offices, places of amusement, everywhere. It was all very amateurish, but it worked. Buses from local L.P.T.B. branches joined the other forms of transport. Some, who had their own cars, went round and collected others in the pouring rain without which any such deployment would be incomplete. The bad weather, in fact, added enormously to the difficulties of the men arriving at their isolated gun and searchlight sites. The heavy equipment slithered about on the slippery grass, vehicles sank to their axles in mud. Everything that could go wrong seemed to do so in the driving rain, but by the following dawn things seemed

somehow to have sorted themselves out. Guns and searchlights were in position, and if they weren't all actually able to operate, that was not, as will be seen, entirely our fault.

A NEW CHARTER FOR A.A.

It was almost impossible to imagine a more chaotic dress rehearsal for war: not only were the soldiers amateurs, training on equipment that was deplorably short, but there was, in high places, a woolly optimism that everything would turn out all right on the night. But the red light was apparently showing everywhere, and on February 9 the program for bringing the defense of Great Britain up to 1264 heavy antiaircraft guns and 4728 searchlights was approved.

In London the authorized density was 36. In theory, this produced a fire distribution that would enable nine separate targets to be engaged simultaneously, each by four guns. The Home Defense Committee considered this to be a sufficiently powerful scale of defense, and recommended it as adequate with regard to the scale of attack. Some 328 heavy antiaircraft guns were allotted, and, in addition, they agreed that there should be "a new requirements reserve to meet the demands which, without doubt, would arise for the protection of new ports, new factories etc., which were brought into operation." This, together with a maintenance reserve, brought the total reinforcements up to 696 extra guns—and an extra 27 million Pounds.

In February 1939 the first 4.5-inch gun was ceremoniously emplaced in the presence of a large congress of press representatives, and in March Mr. Hore-Belisha announced that the strength of A.A. batteries was to be nearly doubled: the five A.A. Divisions were to be increased to seven, and the A.A. Corps was to have the status of a fully fledged Command.

TARGETS APPEAR

At the beginning of the War the gunners had been on their toes, and, indeed, much too quick on the trigger. Three days after the outbreak of war, in the Sheerness area, all guns opened fire for five minutes on aircraft, although recognition signals were given, and one aircraft from No. 64 Squadron was shot down three miles east of Sheerness. The same day other friendly squadrons were engaged over Thameshaven, but happily without result. The German Air Force, however, was not putting up any display of strength, and without air attack it was difficult to keep a fine edge on the defenders' enthusiasm.

The first test came on October 19, in Scotland, and the troops who might have been the least prepared of all were the heroes of the occasion, for, at 7 a.m. that day, a searchlight site situated in a very remote spot at the mouth of the Firth of Forth located the conning tower of a submarine. At that time the searchlight sites were not connected by telephone, so the NCO in charge jumped on his bicycle and rode to the nearest public telephone, where he passed the information to the Sector Operations Room and on to the Admiral in charge. Out went an Anson aircraft, followed by four destroyers, and their report was later received that the U-boat had been sunk: the Admiral sent his personal congratulations to the searchlight detachment.

That same morning, at 9:20, the Gun Operations Room in the Forth area started to record the approach of enemy aircraft, flying very high, and obviously out on reconnaissance. The operations continued all the morning. From time to time the aircraft were seen by the gun detachments, but they were too high to be positively identified, and so fire could not be opened on them. Just before half-past two that afternoon, although no warning of any sort had been received and no sirens had sounded, operators in the Forth Gun Operations Room were amazed to see the red light flashing, which meant that guns were in action. They at once sent out the order "Action" to all sites, and almost at that moment enemy aircraft appeared over the Forth Bridge. The Germans made no attempt to bomb the bridge itself. They were trying for two warships lying near, and for another that was coming up the Forth.

A gun site south of the Forth was in the middle of gun drill, when suddenly the spotters saw what was unmistakably German aircraft approaching the Forth Bridge. Hurriedly the detachment changed their dummy ammunition to live while their instruments were laid on the aircraft. Before they could open fire it had dived too low. Soon another appeared from the clouds, and the gunners shot a large portion of the tail plane down into the Firth of Forth. A Spitfire finished the raider off, and it crashed into the sea near Fort Seaton. This was the first heavy antiaircraft battery to help in bringing down an enemy raider over this country.

We were most dissatisfied in March 1940, when the Germans made an unexpected raid on Scapa, for on this occasion the Germans had all the best of it, and there was no glory for the guns, the searchlights, or the aircraft. The attack took place just before dark on March 16. It had been a misty day, typical Orkney weather, and the Germans came in from the east at a low altitude. The attack was delivered in two parts: dive bombers attacking the Fleet, and high level bombers the aerodrome.

There were a certain number of guns which had only recently been emplaced and were still short of essential parts. But of the 52 guns that could fire, only 44 did so, and these made a very poor showing. The 3.7 inch and 4.5 inch guns were quite unable to engage low flying or diving aircraft, and as a result a great urgency had been put into the production of more light antiaircraft guns to deal with this type of target. But the light antiaircraft guns did not distinguish themselves either that day. Several of them jammed, and those that fired found that in the half light the flash of discharge was so bright that the target could not be kept under observation.

Once more the experts descended like vultures on the area, and, from the facts, one thing became abundantly clear. In default of enemy action, which would provide the necessary targets and spur to keep the defense up to a high state of efficiency, recourse must be had to more frequent visits to practice camps. Many new practice camps had been prospected, but towing aircraft were very scarce, and even in the old established camps the practicing batteries were very often unable to shoot owing to lack of target aircraft. Later on in the War, when the country became accustomed to the noise of guns, what was known as

"on site" practice was permitted, and every gun-defended area had its own particular battery which was permitted to shoot at any time during the day, provided friendly aircraft were not about.

DUNKIRK AND ITS REPERCUSSIONS

The withdrawal from Dunkirk, and the almost miraculous success that the Navy achieved in evacuating hundreds and thousands of our men—albeit mostly without arms—had caused a tremendous surge of optimism in the country.

And, at once, everyone started running round in circles blaming someone else for our predicament, although the blame really lay in our long immunity. Always we had had time to fight on until sufficient equipment had been manufactured to enable us to win. So of course we were only once again running true to form when we entered a war ill-equipped, mentally as well as materially.

Raids against our ports began in earnest, and on the night of June 18-19 we had our first experiences of a full-dress bombing attack.

About a month previously I had been asked by the Prime Minister whether fighter and antiaircraft defense could protect us against night raids. To this I had replied that everyone should realize how terribly difficult a thing night interception is and that it was my considered opinion that we should probably get a "pasting." I may say Mr. Churchill did not disagree with that view.

As it happened, on this first occasion we had just that beginners' luck that gave us an overexaggerated sense of our own skilfulness. Certainly it was most encouraging, and if we had been able to produce similar results regularly in the months that followed, the night defense of the country would have been well on its way to being assured.

The credit, and, indeed, the most gratifying part of the night's work, which resulted in seven destroyed and six probably destroyed out of a force of eighty-one bombers, was due to the searchlights, whose hard winter training seemed to be producing results.

As we have seen, there had already been considerable increases in the heavy antiaircraft defenses since the outbreak of war. With the present demands, which came in from all sides, they were now totally inadequate. The aircraft industry alone was protected by 25 per cent of the heavy guns in the Command, and in May the Prime Minister himself had written a minute in which he directed, "the utmost available antiaircraft strength should be concentrated on the aircraft factories—they are more important than anything else." The Navy were not backward in demanding further protection for their own establishments, and, indeed, there was wisdom in these demands, for the previous experiences of the War had shown that there was a very marked difference between the efficacy of enemy attacks when heavy antiaircraft defenses existed and when there was nothing of this sort to act as a deterrent. In fact, during the spasmodic raids that preceded the Battle of Britain the tendency became more and more to fly round the coast and except in the South-western area, where the defenses were weak, scarcely to venture inland. A surprisingly large number of enemy aircraft actually dropped

their bombs in the sea and never crossed the coast at all.

Now, too, the land forces were becoming Heavy A.A. conscious, and, with the possibilities of sea and airborne invasion, the Army put in demands for the protection not only of the forces themselves but of probable centers of defense.

But the whole question of morale and the people's reaction was not based on any rational thing, but rather on the emotions of the moment, and so we found ourselves faced with continual demands for guns to defend places of no importance from a strategic or production point of view and in great danger of being forced to dissipate our resources so that there would be no adequate defense anywhere. The truth is that there is no half-way house in antiaircraft defense between a first class defense, which will have a large lethal and deterrent effect on the enemy, and a token defense of a few guns, which would suffice to keep up the morale of the local population and, at the same time, harass the enemy sufficiently to prevent his carrying out accurate bombing.

BATTLE OF BRITAIN

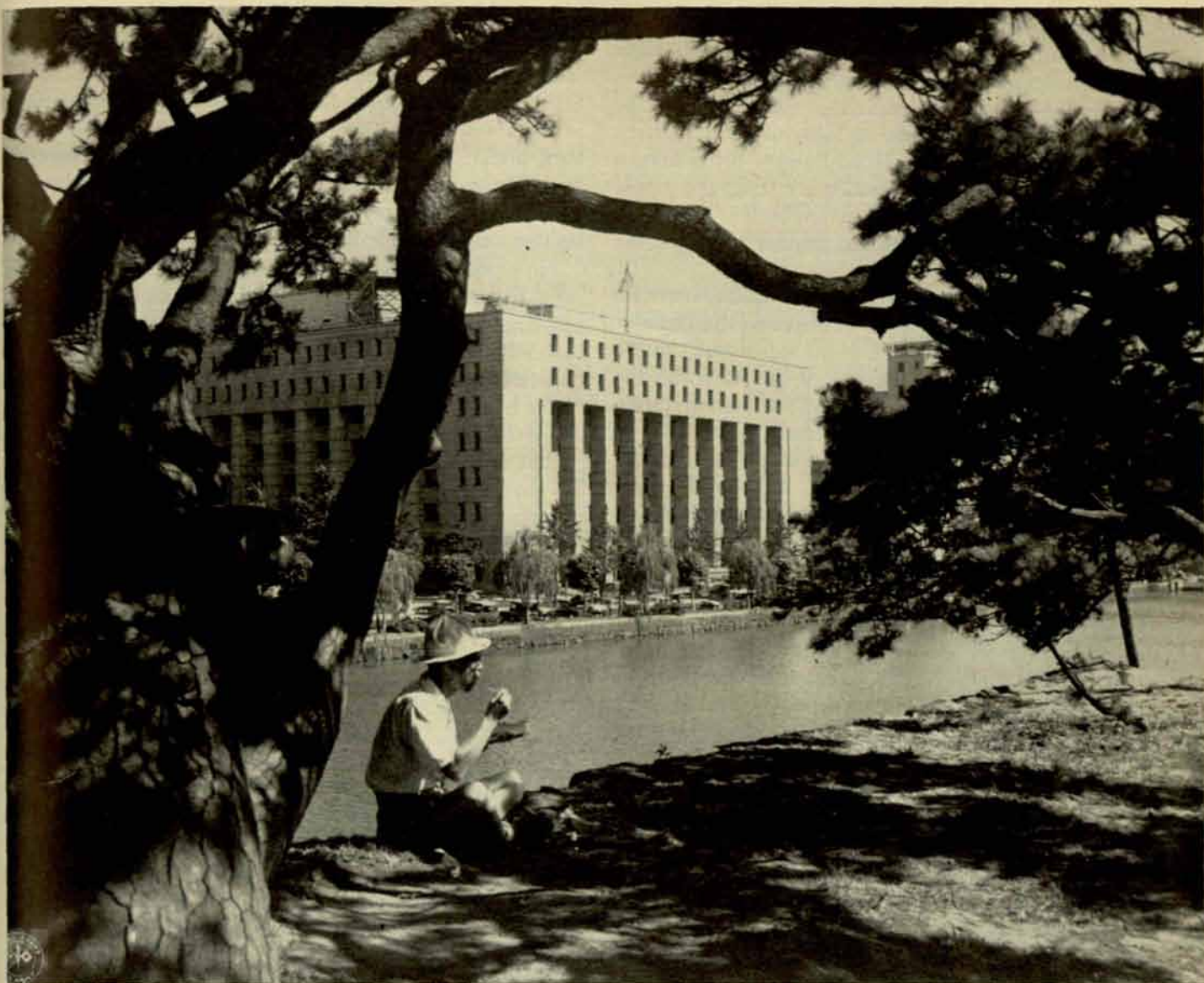
The Battle of Britain has gone down in history as a RAF battle. There is no doubt that the RAF played the predominant part in the great victory, nor is there any doubt of the heroic fighting qualities of the pilots who took part in that battle. It is, therefore, not unreasonable to expect that the lesser role played by the ground defenses should, first of all, fade into the background, and then into complete obscurity. Yet without the ground defenses the Battle of Britain could not have been won by the fighter pilots, any more than the Battle of El Alamein could have been won by the infantry and tanks without the gunners. That this is not merely a partisan view is evident because, right in the middle of that battle, Dowding himself made demands on the Government for more antiaircraft guns and more searchlights, clearly showing that he appreciated the value of these weapons.

CHURCHILL TAKES AN INTEREST

One result of all these stirring events was to bring the importance of antiaircraft defense into a sudden publicity. Everyone started taking a critical interest in what we were up to, and the Prime Minister, in particular, had expressed the wish to keep in close touch with our activities. To enable him to do so, he appointed Major Duncan Sandys to be his liaison officer with us. At the same time, Mr. Churchill asked us to analyze the results of our fire during the first year of the War. It worked out that for the whole year (including the nine boring months when our efficiency went back and back) the rounds per bird were about 350 for heavy antiaircraft and about 250 for light antiaircraft. In the last two months of the year, however, leaving the barrages out of consideration, this had decreased to some 240 for the heavy guns and 120 for the 40mm equipment. As in everything else, practice was making perfect, and in the most heavily engaged Division of all the heavy antiaircraft figure had fallen to 170 rounds per bird.

Our most urgent need was for the new G.L.2 radar sets.

(Continued on page 39)



Behind Suzuki's new life lies the guiding hand of SCAP.

Occupation Headquarters

By Captain W. L. Harrelson, GSC (Infantry)

"... in so far as I know history, no idea for emancipating the mind, for enlarging the conception of human rights, or for dignifying human rights has ever come out of military ranks... no professional army holding power has ever favored the extension of liberties.... It never thinks intimately, energetically, longingly of anything beyond the means of asserting its own power...."

This attack by an American college professor in 1946* is typical of one of the oldest charges hurled at the Army:

*Professor J. Frank Dobie, "Samples of the Army Mind," *Harpers*, December 1946.

that it is narrow and militaristic in its approach to fields other than the main business for which it is trained.

In Japan since 1945, as in the other occupied areas, the Army has built a solid rebuttal to such charges. Hardly had the gunfire of the military victory stopped before the Army was called upon to tackle the civil problems of the greatest peacetime occupation job in history. The battle-gearred military machine had to be shifted quickly into the role of Good Samaritan and teacher. The battered enemy had to be helped back to his feet and taught a completely new way of life.

In untangling the economic, social, and political problems of four and a half years of occupation in Japan—problems far from the scope of normal military responsibility in a democracy—the Army has proved its adaptability to the world of civil affairs. The role of General Headquarters, Supreme Commander for the Allied Powers, better known as SCAP, in directing the Occupation is a striking example of this adaptability. It has been displayed both in the organization of the headquarters and the manner in which the civil problems of occupation have been solved.

SCAP is part of the two-in-one Tokyo headquarters set up to handle the two-pronged job of directing the Occupation for the Allied Nations while at the same time controlling the air, ground, and naval forces of the American Far East Command. These American forces are scattered from Japan to the Philippines. To assist General MacArthur in his international occupation role as Supreme Commander for the Allied Powers, the SCAP staff operates. To assist him in his role as Commander in Chief of the Far East Command, the FEC staff functions with general and special staff duties. Together, the two staffs make up General Headquarters, Supreme Commander for the Allied Powers, Far East Command. Wherever the military aspects of the Occupation overlap the civil, the Far East Command staff has limited SCAP functions. The relationship between the two staffs is very close. Unity of command is provided in the person of General MacArthur. This unity at the top is continued in the position of one chief of staff who acts as deputy and heads both of the staffs.

The Army has shown its desire to broaden its viewpoint by integrating civilian specialists into the headquarters. The advice of these specialists has aided the military section chiefs greatly in finding sound solutions for the technical and knotty problems of occupation.

The Supreme Commander's headquarters has power in the field. The Eighth Army stretches through the Japanese home islands from the northern reaches of Hokkaido to the southern shores of Kyushu. It is the operational right arm of the Supreme Commander. The Eighth Army makes certain that the Japanese nation carries out occupation directives. It keeps the Supreme Commander informed of conditions throughout the country. Air power is supplied by Headquarters, Far East Air Forces, and the Fifth Air Force. Headquarters and units of the United States Naval Forces, Far East, take care of the Navy's support role. An international touch is added to the power picture by the British Commonwealth Occupation Forces. These British forces have their own occupation zone and operate under the Eighth Army.

A double mission faced SCAP as it was born in the midst of Japanese surrender. There was first the task of insuring that Japan would never again become a menace to the peace and security of the world. There was the second mission of building a peaceful and democratic government based on the expressed will of the people. To those who fought the Jap from island to island on the long road back, fell the responsibility for rehabilitating and reforming him.

There were in the beginning such immediate problems as the security of the occupation forces, the disarming of Japanese troops, and the destruction of armaments. Closely

upon the heels of security and disarmament rolled the flood of nonmilitary problems in this war-ravaged country, whose own government was in the throes of collapse. American direction was badly needed in such pressing problems as relief and rehabilitation. Getting solutions to these problems under way was merely a foundation upon which to build lasting reform and rejuvenation of the Japanese economic, social, and political systems. The emphasis now is on this long range development.

No phase of Japanese life has been left out of the planning. From the clouds of DDT to the new constitution guaranteeing all the freedoms of democracy, Suzuki-San, the "John Public" of Japan, has watched the procession of occupation benefits grow. Politically, this little fellow has found himself lifted from the mire of feudalistic nobodiness and cloaked in the dignity of the individual. Economically, he has seen the occupation forces earnestly work to steady his shaky Japan. Socially, he has watched the reformation of his entire society as a basis for democratization. Behind Suzuki's new life lies the guiding hand of SCAP.

The general plan of operation for the Occupation is simple and direct. It makes the most of the existing Japanese governmental structure without disruption. The plan is based on the issuance of directives from the Supreme Commander's headquarters, directly to the Japanese government. From there on the burden of proper execution is on the Japanese. No elements of Japanese constitutional governmental structure have been displaced by Allied agencies. Occupation personnel in the field operate in a purely surveillant and advisory capacity. On the local levels, military government units are responsible for checking on Japanese execution of directives. This plan has meant economy in the number of occupation personnel necessary. It has resulted in a remarkable smoothness of operation.

ROLE IN ECONOMIC RECOVERY

We could no more afford to risk further economic disablement in Japan, with the resulting drag on world recovery, than we could risk having her economic potential directed again into the channels of war-making. We cannot expect her to grow as a free democracy if she cannot stand on her own feet economically. Until the Japanese nation can stand alone she will continue to be a burden on the back of American taxpayers. The tangle of problems involved in getting Japan rejuvenated economically is knotty. In meeting these vital problems the Army has proved its ability in fields far from the military.

Japan has long been plagued by a steadily growing population to support with all too few acres of arable land and with insufficient raw materials of her own. Her prewar economic system was delicately balanced on a scale of imports and exports. By importing raw materials she was able to turn them into finished products in her well developed industrial system. These products were exported for food, raw materials, and other necessities. During World War II she was able to maintain this balance by drawing raw materials from the occupied territories of Korea, Formosa, Manchuria, and North China.

The end of the war found this entire system wrecked. There were no outside sources of raw materials. There were

no outside markets for finished products. The Japanese nation was isolated in its home islands with its supply lifeline cut.

The early days of occupation found Japanese industry at a standstill. Besides the mental lethargy of defeat, there was a shortage of coal, steel, fertilizer, and other essentials. There was a hesitation to renew operation of plants which might be dismantled for reparations. There was an acute inflation problem. There was disruption in the industrial monopoly system, unrest among labor, shortages of food, and a general uncertainty as to the future. It was a dark economic situation which General MacArthur and his staff waded into.

This situation was met by designing special staff agencies to reach into every phase of Japanese economics. Problems have ranged from battling the tricky black market and preventing paralyzing general strikes to squeezing extra grains of rice from the overworked paddies into Suzuki's dinner pail. Let's take a look at some of the major activities of these sections. Here the story of Army adaptability is vividly told.

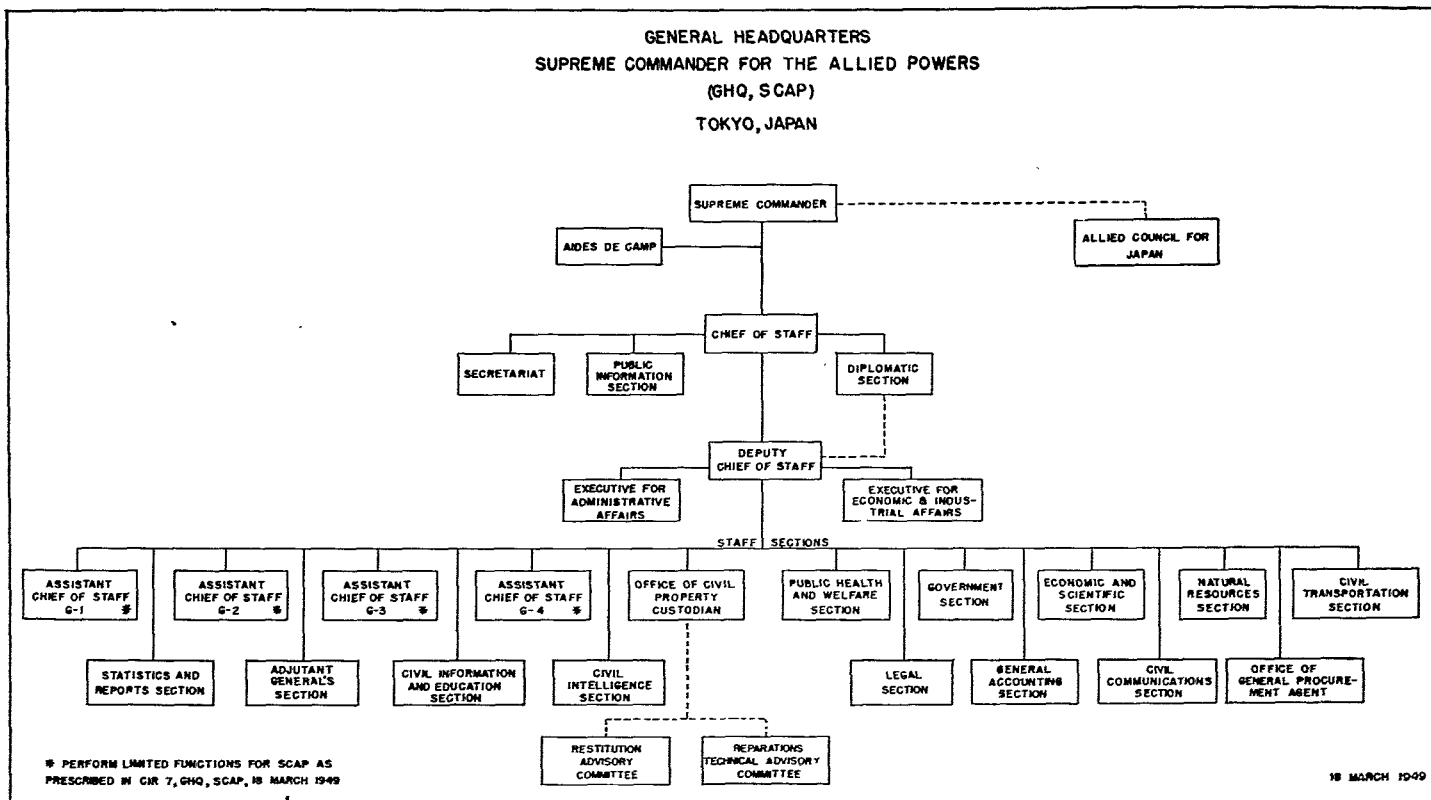
The Economic and Scientific Section has led the way in handling the civil problems of economics. Labor, industry, foreign trade, finance, price control and rationing, science and technology—each throws its own curve balls at the section. The batting average of accomplishments is high.

Foreign trade is being carefully rebuilt. Hopes of Japanese economic recovery are dependent on this trade. The results are heartening. For example, during the first ten months of 1949 imports totalled over \$784,000,000. Exports hit over \$420,000,000. Such results are impressive when compared with the dead standstill of 1945.

In industry, the removal of war potential was carried out smoothly, but the problems of rehabilitation are unending. The over-all production index has been rising with the assistance of the Economic and Scientific Section. In October 1949, it was 97.6 per cent of the 1932-36 production level. The gains are due chiefly to increased coal production, transportation improvements, and increased imports of raw materials. SCAP prodding shows results in the October coal production figure of 106.2% of the 1932-36 level.

Light has been let into other dark corners of Japanese economy by the Economic and Scientific Section. Reorganization programs to get Japanese financial institutions back on a sound basis and to get rid of the Zaibatsu industrial combines have been pushed. A democratic labor movement and effective uses of manpower resources have been high on the list of musts. Scientific research has been encouraged as an aid in Japan's recovery.

The economic rehabilitation of Japan depends ultimately on the use made of her own natural resources. Because of the need for assistance in the development of these resources the Natural Resources Section was formed. This section has had a wide range of activities. Comprehensive surveys and programs in the fields of mining and geology, agriculture, fisheries, and forestry have been basic accomplishments. Starvation crises have been sidestepped through improvement in Japanese agricultural methods, land reclamation, and extension of authorized fishing areas. Rice collections by the Japanese Government have been tightened. Fertilizer has been imported in order to bolster Japanese crops. A vast land reform program for transferring land ownership from absentee landlords to those who actually work the soil is an outstanding result of the Natural Resources Section's efforts.



SCAP organization reflects adaptability to civil problems of occupation.

Other staff agencies have played important roles in the economic recovery of Japan. The Civil Communications Section has directed the demilitarization and rehabilitation of Japan's system of communications. The Civil Property Custodian Section has acted as custodian and disposer of foreign owned property and property looted from the wartime empire.

The badly damaged civil transportation system has been given new life under the supervision of the Civil Transportation Section. Members of this section have directed rehabilitation in merchant marine, rail, and highway transportation. An example of the results is evident in the increase of 25,000,000 metric tons of freighted tonnage during the third year of occupation over the preceding year.

The problems involved in reparations must be met after war. In postwar Japan, these problems were handled by the Reparations Section (no longer in operation). During the second year of occupation, each of the eleven member nations of the Far Eastern Commission established Reparations and Restitution Delegations in Tokyo to operate in conjunction with the Reparations Section. The 1947 United States decision to authorize limited deliveries of reparations to China, the Philippines, The Netherlands, and the United Kingdom has been carried out. The problems of reparations have been carefully handled because of their impact on the over-all economy.

When Suzuki picks up his bigger food ration today or buys a new household gadget from a well stocked merchant's stall, he is enjoying the results of a lot of hard work by the agencies of the occupation in planning and supervision and by his own fellow Japanese in translating those plans into action. The answers to problems involved in directing economic rehabilitation for an entire nation don't come in normal military training. The vision and ability displayed are solid testimony to the adaptability of the Army fields outside the military.

SOCIAL REFORM REFLECTS ARMY ADAPTABILITY

Democratizing and modernizing a feudalistic society would be beyond the capabilities of the Army in the eyes of some critics. Now the record proves differently. The close attention to social improvements reflects Army awareness that lasting democratization must grow from much deeper roots than merely having troops on the ground. The superb manner in which the Occupation has adapted itself to the job of revamping the social structure of Japan, is reflected in the accomplishments of its headquarters.

Although the public health and welfare problems of Japan have been much the same as those in other war-torn nations, the other aspects of its social situation reached deeply into the heart of a feudalistic society. Besides the social need which met the eye in over two million levelled homes and the families disrupted by 1,850,000 deaths, Suzuki's mind had to be cleared of the deep scars of militarism and feudalism.

The Civil Information and Education Section has the job of preparing Suzuki for democratic citizenship. Through schools, press, radio, and other media this section reaches into his daily life. The job of mentally preparing Suzuki for democracy is a challenging one.

The early efforts of the section were directed toward ridding the educational system of militarism and ultranationalism. No longer do the sons and daughters of Japan march to class in military formation or study the divine destiny of their country. The emphasis since early 1947 has been on the long range tasks of decentralization of educational control and training in democracy.

The section has taken an active role in the field of civil information. One of its first acts was the freeing of all Japanese media of public information from national government domination. The civil information program is carefully brought to the new students of democracy through the press, motion pictures, radio, and even mobile information units which poke into remote corners. The program has told the people of occupation policies and objectives. It has sparked rehabilitation by passing out useful information.

The Civil Information and Education job also reaches into the fields of religion and culture. Restrictions on religious freedom have been swept aside. State support and control of the Shinto religion have been eliminated. Foreign missionaries are encouraged. Activity in the field of fine arts has been revitalized. The value which history will place on the Occupation will depend to a great degree on the success of this civil information and education program in reorienting Suzuki mentally.

Another very successful program of the Occupation has been that of the Public Health and Welfare Section. The accomplishments of this section make an impressive ledger of examples of the Army's ability to adapt itself to the needs of civil government. The incidence of communicable diseases has been brought to the lowest levels in the history of Japan. In 1946 the entire nation was vaccinated, under American supervision, in order to stop a threatened small-pox epidemic. The entire Japanese medical and pharmaceutical structure has been overhauled.

Men in khaki have been watchdogs at the repatriation centers. Their health control and quarantine measures have relieved the dangerous hazard of millions returning from disease-ridden Asiatic countries. A national sanitation and health program has been pushed vigorously. Members of the section have directed disaster relief in every postwar Japanese flood, earthquake, and tidal wave. Disease control programs, nutritional surveys, and narcotic controls have been pressed by the Occupation. The Daily Life Security Law, the first great welfare law in Japanese history, has placed upon local governments the responsibility for care of the destitute and plans for disaster.

Finally, such advancements as the Health Center Act for basic health services, a venereal disease control law, and child welfare acts have been pushed by the Occupation. The vigorous and earnest manner of the headquarters' campaign for improved public health and welfare in Japan has built a reservoir of confidence and good will in the people.

The significance of repatriation in the social picture was recognized early. Broken homes could not be happy homes and an extensive program was launched to bring back those Japanese who were overseas at the end of the war. G-1 and G-3 of the Far East Command general staff, acting in a

SCAP capacity, have supervised the return of well over 6,000,000 Japanese from other countries.

PROFICIENCY IN POLITICAL REFORM

It was a strange experience for little Kimiko Kanda as she took her place in the line of village voters at general election time in 1946. It took no little courage to join that line which the law had formerly labelled "men only." Kimiko wasn't supposed to know anything about politics. Her world was shut in by the walls of the home and the demands of the family. The rigid family law wrapped her in a state of semi-slavery. The old Japanese proverb "there is nothing so sad as to be born a woman in Japan" was all too true.

But election day, 1946, marked the birth of a new equality for Kimiko and the thirteen million other eligible women voters. They made their first appearance at the ballot boxes a declaration that they were catching the new spirit of democracy. Thirty-nine women were elected to the national House of Representatives by these housewives who had quite obviously ignored their husbands' advice. This experience of Japanese women in their first appearance at the polls is a striking example of how the Occupation has dignified and enlarged the Japanese concept of human rights.

In his political life, Suzuki had gotten into a big mess. Several SCAP staff sections were designed for the job of straightening him out. The Occupation had to adapt itself quickly to the problem of breaking the hold of feudalism and militarism and replacing them with peaceful and democratic government. From the ground up the job has progressed with the Government Section playing the leading role.

Sweeping reforms have transformed Japan from a feudal police state into a modern nation with a new constitution guaranteeing all the freedoms which Americans enjoy. Roger Baldwin, founder and director of the American Civil Liberties Union, visited postwar Japan to find what progress had been made in civil liberties. Here is what he found:

"The American record to date in Japan is one of the most revolutionary accomplishments in history. When we leave Japan . . . we may have achieved a near miracle in human relations.

"Never before has a conquering army turned enemies into friends and won their eager cooperation in transforming a military autocracy into a democracy. . . .

"I got in Japan a fresh faith in the power of our American democracy to lead peoples on the road to freedom. . . ."

The renunciation of war is a unique feature of the new constitution. Sovereignty has been transferred from the emperor to the people. Those sharing responsibility for

Japan's aggression have been removed from public office.

Other signposts mark the road of political reform. The strangle hold of the highly centralized police arm has been broken. Government control of the powerful industrial combines has been shattered. Thousands of political prisoners have been released. These and many other accomplishments have been brought about through the existing governmental machinery without disruption or disorder.

Other staff sections play vital roles in the postwar political life of the eighty million Japanese. The work of the International Prosecution Section in getting conviction of former Premier Tojo and the other top war criminals before the International Military Tribunal is a typical example. The Legal Section has concentrated on flushing and prosecuting the lesser war criminals. It has also advised the Supreme Commander on legal procedure. The Civil Intelligence Section has kept a close watch on Suzuki while the occupational reforms have progressed. The Supreme Commander receives State Department advice and assistance through the Diplomatic Section. All have contributed greatly to a well rounded treatment of occupational problems.

The problem of civilian law and order has been handled by putting responsibility on the Japanese courts and police system. Offenses against the Occupation are tried in occupation courts or in Japanese courts. The remarkably few offenses against the Occupation testify to the soundness of the methods used.

It was a dark day for Suzuki-San in 1945 as he heard his imperial master's own voice announce surrender. He waited fearfully for the horrors promised by the propagandists if the "white barbarians" ever forced their way into the Japanese homeland. But it is a much brighter day today as he sits down before his well filled rice bowl and counts his blessings. The intervening years have given Suzuki new hope because of the ability of the military organization of the victors to adapt itself to the nonmilitary complexities of economic, social, and political recovery and reform in a decayed and feudalistic nation. The partial roll call of SCAP accomplishments pictured here is representative of the results which have been attained throughout the many echelons of the occupation.

The American Army in Japan is lifting an entire nation from the subjection of militarism and feudalism. It is patiently teaching the people the broad concepts of human rights and liberties which we in America hold dear. It has thought "intimately, energetically, longingly" far beyond "the means of asserting its own power." The Army may point with pride to the Occupation of Japan as a solid rebuttal to any charges that it is narrow and militaristic in its handling of affairs outside the military.

*"Japan's American Revolution," *Reader's Digest*, March, 1948.



HOW YOU CAN HELP YOUR JOURNAL

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Splendid progress has been made. The subscription list has increased from 2500 in 1946 to 4300 now. However, we need 5500 subscribers at the present rate of \$3.00 per year. There is, of course, an alternative of increasing the subscription rate, but this will not be necessary if we can reach all antiaircraft artillerymen who are in need of this publication. If you, a subscriber, believe that the JOURNAL will benefit one of your friends, you can help by bringing this to his attention.

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Artillery Missions By High-Performance Aircraft Observers

By Major Paul F. Wilson, F.A.

Are fighters engaged in adjustment of artillery fire suitable targets for AAA guns? Apparently, above the effective altitude of automatic weapons, they have operated practically unmolested.—Ed.

ARTY/R DEVELOPMENT

The term "Arty/R" has been adopted from the British. The original meaning was artillery adjustment by Air Corps Reconnaissance aircraft. During World War II the term was used to include adjustment of artillery by all high-performance aircraft.

Artillery adjustment from the airplane won little support until wireless techniques were introduced to solve the communication problem. The wireless was used in November 1914 and improved during 1915. Until the end of the war, one-way wireless telegraph was used. Ground panels communicated messages to the observer. The rapid development of Arty/R came during the battle of the Somme, July to October 1916. The Royal Flying Corps' single-seat fighter drove the German bomber fighter from the battlefield and was able to maintain control of the air until the German air service was reorganized in October. The French and British observation planes adjusted their artillery with little enemy interference and obtained remarkable results. A German report is quoted: "With the help of observation planes, the enemy artillery completely stifled ours."

Following World War I, artillerymen recommended that the artillery be given its own means of air observation. However, the army planned to attach air corps observation units to divisions. The observation balloon was kept to allow the artillery an air observer with whom close liaison could be maintained. Two-way communication was established with the airplane using CW wireless.

The clamor for a light artillery plane grew in U.S. artillery circles. During the 1941 maneuvers, civilian pilots were hired to fly light aircraft for the artillery observers. At the completion of the maneuvers, the inclusion of the light aircraft, pilots and maintenance crews as an organic part of the artillery units was recommended. The need was not overlooked for observation of long-range artillery fires by observation airplanes generally protected by pursuit aviation and operating from airdromes well to the rear. However, that need was not pressed because of the failures of divided responsibility for that type of air observation and because of the confidence of the Field Artillery in its ability to handle the problem of air observation for the bulk of field artillery air observation requirements.

June 6, 1942, the War Department directed the establishment of Organic Field Artillery Air Observation. The

Field Artillery School established its first liaison pilot's course 3 August 1942. Reports of operational flying of light aircraft in the combat zones of the Pacific were received in the fall of 1942.

During the early stages of the North African campaign, Arty/R was impracticable. In the fight across the desert, in early 1943, the air OP's and ground OP's gave reasonable observation to the ranges of the light and medium artillery available. However, in the Tunisian campaign, camouflage and defilade positions were easier to find than in the broad stretches of the desert. The air OP could not observe adequately to the extent of the range of the "Long Toms" present.

In Italy, the air OP was limited to altitudes of 500 to 3000 feet and to locations over our own front lines. Altitudes above 3000 feet were dangerous because hostile aircraft were intermittently present. Below 3000 feet automatic weapons were a threat over hostile territory. The air OP often did venture beyond the front line and to altitudes of 7000 to 8000 feet. The British air OP was able to engage in tank hunting from altitudes of 6000 feet. This disregard of rules of safety resulted in air OP losses. Not until the latter part of 1944 was it considered advisable for the air OP to observe from altitudes of 7000 and 8000 feet (Florence to Bologna). From an altitude of 3000 feet enemy artillery was often well defiladed from the air OP behind the Italian mountains at distances of 3000 to 6000 yards beyond the front lines. Haze and clouds often limited visibility to 6000 to 8000 yards. Scattered clouds made adjustment in the shadows difficult at those ranges. On clear days registrations could be conducted beyond 10,000 yards. However, the 155mm gun battalions had difficulty obtaining registration at the ranges of their fire plans. With the best visibility, and from an altitude of 8000 feet using field glasses, registration was limited to observing ranges of 18,000 to 20,000 yards.

The first attempt to use U.S. high-performance aircraft on an Arty/R adjustment was made in the Fifth Army sector on 18 Sep 1943. Arrangements were made through the Fifth Army Artillery Officer to use P-51's of the 111th Reconnaissance Squadron to adjust the 155mm guns of the 36th FA Battalion. The squadron was in direct support of VI Corps with the primary mission of reconnaissance and intelligence photographs. Two planes went on the mission.

On that mission, Lt. Earl adjusted C Btry, 36th FA Battalion on an enemy gun position at a gun range of 24,100 yards. Fire for effect silenced the enemy battery. Wire had been laid for the mission from the battery position to the VHF radio at the airfield.

On the 24th and again on the 25th of September 1943, the 36th FA Battalion was registered by pilots of the 111th Reconnaissance Squadron. The VI Corps Artillery reported the adjustments recommending that:

1. *Reconnaissance squadron pilots be trained in artillery adjustment.*
2. *Corps artillery be furnished 2 VHF radios.*

During November 1943, many heavy artillery battalions joined Fifth Army for the offensive in the mountains north of Naples. The mountains, rain, and winter haze made registration and observation into the enemy artillery areas impossible at times. During the battles for San Pietro in December, counterbattery was restricted by the lack of adequate observation. In February, the 240mm howitzer battalions (697th and 698th FA Bns) arrived in Italy. The spring months brought more flying weather for needed Arty/R. The 240mm howitzer battalions with 8" guns attached were the first to use Spitfire and P-51 observation continually and on a large scale. Registration of the 8-inch guns was seldom possible without Arty/R at the ranges normally employed. The VHF radios (SCR 522) were made available to the Corps Artillery and heavy battalions.

During the spring of 1944, the corps artilleries of the Fifth Army made valuable use of Arty/R. Fire plans required registration, destruction, and observed counterbattery at gun ranges of 20,000 to 25,000 yards which would have been impossible without Arty/R. By the first of March, Arty/R shoots fired per day averaged four for the British X Corps, and three each for the American II and VI Corps. Counterbattery programs continuously employed Arty/R. The daily counterbattery program was developed as follows:

- a. Enemy batteries to be adjusted upon and priority of attack were determined in the early evening from the day's enemy artillery area photos and shell reports.
- b. The Photo Intelligence section marked the targets on photographs, provides lines to indicate scale and computed coordinates for initial firing data.
- c. Those enemy batteries within range of the visibility of the air OP were assigned to corps artillery groups for adjustment the following day. Those enemy batteries deeper in enemy territory were submitted through Fifth Army Air Support Control to the reconnaissance squadron for adjustment.
- d. A corps artillery staff officer, by direct communication with the reconnaissance squadron, prearranged the time, radio channel, call sign, primary and alternate target for each mission to be flown.

Arty/R adjustments were made for VI Corps Arty during four months of the existence of the Anzio beachhead. For the period of the breakout attack, 23 May to 4 June, 112 missions (224 sorties) were flown making 141 adjustments. Search cover was furnished by P-51's over the enemy artil-

lery areas for daylight hours of the first days of attack. Pilots were furnished photos marked with enemy batteries which were grouped according to terrain feature. Adjustments were made on enemy batteries observed to be active and on those indicated to be active by shell reports.

Enemy battery adjustments by high-performance aircraft (HPA) pilots were of both types, area and destruction. Destruction fire was continued until at least one direct hit was obtained on each piece if possible. Time required over the target was often 75 to 90 minutes.

Danger to the HPA pilot and his "weaver" was reduced by radar warning of enemy or unknown aircraft in the vicinity and by counterflak programs during the mission. In several cases, when the pilot was annoyed by flak, he temporarily abandoned the adjustment on his target to attack the guns firing. When the 240mm howitzers were being adjusted, Long Tom batteries often stood by to neutralize heavy antiaircraft artillery. At Anzio, where the concentration of "ack ack" was the heaviest encountered in Italy until that time, only one high-performance aircraft was appreciably damaged by flak.

Training of ground forces and reconnaissance squadrons preparing for the landing in France included Arty/R. The 12th Army Group placed the control of its pool of Arty/R missions in the hands of the army artillery officer in coordination with the Army G-2 (Air). Briefing details were to be transmitted to the Tactical Reconnaissance pilots through a ground liaison officer at the Tactical Reconnaissance Group. The present air-ground control system has adopted these procedures used by the 12th Army Group.

In the Pacific, plans for landing operations often included adjustment of artillery on targets deep within enemy territory by Navy high-performance aircraft before the organic air OP was available.

The Russians reported their use of observation planes for long-range artillery adjustment during the siege of Leningrad (1941-1943). One plane was allotted to several artillery regiments. Escorts of four to six fighters were provided for each observation plane.

Very little night adjustment by air OP or HPA pilot was accomplished during World War II. Successful observations on clear dark nights as well as during moonlight have been reported. In the Pacific, the Navy PBY Catalinas and TBF Avengers were employed for limited counterbattery observation at night. Air OP's were tried at night in all theaters. Few missions were successful because of the difficulty of keeping the location of a target after it was spotted. Night flying requires coordination with antiaircraft defenses, with fighter patrols and with adjacent artillery (use of VT fuze).

PRESENT TACTICAL RECONNAISSANCE ORGANIZATION AND EQUIPMENT

Plans for future Arty/R require that the Army's artillery missions reach the Tactical Reconnaissance Group of the Tactical Air Force through the Joint Operations Center. This Tactical Reconnaissance Group is normally composed of two Visual and one Photo Reconnaissance Squadrons plus a Photo Technical Unit. Each squadron is equipped with 18 jet fighter or light bomber type aircraft. The latter are used as night reconnaissance planes.

USAF PILOTS ARTILLERY OBSERVER COURSE

Training of tactical reconnaissance pilots and navigators in artillery adjustment was initiated at The Artillery School, Fort Sill, Oklahoma, with a course of two weeks beginning April 12, 1948. The first week of the course is devoted to ground instructions and the second week to adjustment from the high-performance aircraft. RF-51 pilots, RF-80 pilots, RB-26 pilots and navigators have attended the school. A refresher course, also of two weeks' duration, is conducted to maintain proficiency in the adjustment of artillery fire.

The pilots learn the altitudes and horizontal distances at which they can best adjust artillery fire both during daylight and at night (with illuminating shell). They determine the flight pattern which will keep the aircraft in observing position and also a means of controlling fire when they cannot observe at all times. The instructor and the students continually strive to improve procedures for keeping the aircraft away from the trajectory and maintaining proper orientation.

By observing the performance of aircraft during adjustments and by conferences with the pilots, The Artillery School is able to determine the limitations and capabilities of the high-performance aircraft in observing artillery fire.

A test of night adjustment using illuminating shell was conducted with three of the classes flying RF-51, RF-80, and RB-26 aircraft. Targets varied in prominence from a road junction to a tank in an area of shell holes. Targets were identified from marked aerial photos. The firing was completed during March 1949. Ground fog resulting from wet soil and high humidity following a rain made identification of the less prominent targets very difficult. A total of 56 problems were fired (area and precision). Of the 18 registrations on a prominent road junction, all but three were satisfactory. Two were adjusted through haze that prevented the observers from seeing the target at the time of percussion burst. In the third, the observer was not properly oriented. The next target in ease of spotting was a scar

formed by cave construction. All of the 14 area adjustments on it were satisfactory. On the more difficult targets, 24 adjustments were made, 17 of which were satisfactory. Causes of the unsatisfactory adjustments were: failure to identify target—four, inadequate visibility—two, and observer not oriented—one. Pilots stated that roads, streams, hilltops, and large objects with regular shapes such as small buildings, were easy to identify under the illuminating flare; but vehicles, trees, and shell holes all cast a similar shadow and were difficult to identify.

Control for night adjustments during the test was "When Ready," and the RB-26 at times had to observe at ranges too great for positive sensings. The air was too bumpy to use field glasses in the RB-26. "At my command" control could have reduced the observing distance but would have increased the time required.

Although the RF-80 type aircraft maneuvers very easily, it has disadvantages for use in night adjustment. Time from take-off to landing is limited by fuel consumption. It carries only a pilot which makes night operation difficult, and it does not carry any special night flying equipment. The RB-26 type aircraft compensates to some extent for its slower maneuvers by carrying fuel for several hours flight, by having a crew to assist in navigation, by being equipped and having the crew trained for night flying.

Artillery adjustment by the high-performance aircraft observer is necessary to complete plans for adequate counter-battery observation, and for full use of long-range artillery. High-performance aircraft is a logical means for obtaining observation for the urgently needed night adjustment of artillery. The availability of the aircraft for artillery adjustment will be dependent upon our superiority in the air. Proper training and coordination between Army and Air Force units is a necessity for the most efficient employment of high-performance aircraft in the adjustment of artillery fire.



General Collins Discusses AAA in Radio Interview*

MR. WILSON: Now, let me ask you this question. What, in your opinion, have been the Army's most noteworthy postwar weapon developments?

GENERAL COLLINS: Some of our most noteworthy postwar weapon developments have been in the field of defense against air attack. Because new developments in aircraft are rapidly making our conventional antiaircraft guns obsolete, our problem has been to develop new weapons to combat the high-flying, fast bombers that may be used to attack the United States. I am happy to tell you that the Army is making genuine progress in this field. Naturally, the details of these weapons will have to remain

secret, but I think that the American people ought to know as much as possible about what they can expect from the Army as far as protection from air attack is concerned. For example, the Army has in the advanced stages of development new antiaircraft rockets, which will be relatively inexpensive, and which we are confident will be able to destroy planes at altitudes above 60,000 feet.

MR. WILSON: Pretty high.

GENERAL COLLINS: Yes, indeed. That's far in excess of the capabilities of present-day bombers.

We also have an antiaircraft guided missile which gives promise of destroying attacking planes at even greater ranges and with even greater accuracy.

*From a radio interview between General J. Lawton Collins and Lyle C. Wilson, Chief, Washington Bureau, United Press.

HONOR ROLL

****88th Antiaircraft Airborne Battalion**
April 1949—Lt. Col. Page E. Smith

****228th Antiaircraft Artillery Group**
July 1949—Col. David W. Bethea, Jr., S.C.N.G.

****107th Antiaircraft Artillery AW Battalion (M)**
July 1949—Lt. Col. Thomas H. Pope, Jr., S.C.N.G.

***713th Antiaircraft Artillery Gun Battalion (M)**
July 1949—Maj. W. B. Pollard, Jr., S.C.N.G.

****260th Antiaircraft Artillery Gun Battalion (M)**
July 1949—Maj. Archie C. Watson, Jr., D.C.N.G.

678th Antiaircraft Artillery AW Battalion (M)
July 1949—Lt. Col. M. T. Sullivan, S.C.N.G.

****305th Antiaircraft Artillery Group**
August 1949—Col. John S. Mayer, N.Y., O.R.C.

****21st Antiaircraft Artillery AW Battalion (SP)**
October 1949—Maj. John F. Reagan

****59th Antiaircraft Artillery Battalion (SP)**
October 1949—Lt. Col. Landon A. Witt

****69th Antiaircraft Artillery Gun Battalion (M)**
October 1949—Lt. Col. Alfred Virag

***101st Antiaircraft Artillery Gun Battalion (M)**
December 1949—Lt. Col. Henry J. Ellis, Ga. N.G.

****19th Antiaircraft Artillery Group**
December 1949—Col. George R. Carey

****39th Antiaircraft Artillery AW Battalion (M)**
January 1950—Lt. Col. Edward T. Ashworth

****4th Antiaircraft Artillery AW Battalion (M)**
January 1950—Lt. Col. Ernest L. Bush

****503d Antiaircraft Artillery Operations Detachment**
January 1950—1st Lt. Peter C. Sweers, Jr.

****75th Antiaircraft Artillery Gun Battalion**
January 1950—Lt. Col. John F. Ballentine

***40th Antiaircraft Artillery Brigade**
January 1950—Col. Morris C. Handwerk

***62d Antiaircraft Artillery AW Battalion (SP)**
January 1950—Lt. Col. Arthur F. Schaefer

****226th Antiaircraft Artillery Group**
January 1950—Col. John D. Sides, Ala. N.G.

****146th Antiaircraft Artillery AW Battalion (SP)**
February 1950—Lt. Col. R. H. Franklin, Mich. N.G.

****70th Antiaircraft Artillery Gun Battalion**
March 1950—Lt. Col. Francis Gregory

****68th AAA Gun Battalion**
March 1950—Lt. Col. Raymond C. Cheal

****10th AAA Group**
March 1950—Col. W. H. Hennig

****95th AAA Gun Battalion**
March 1950—Major Nelson C. Wahlgren

***79th AAA Gun Battalion**
April 1950—Lt. Col. Henry W. Ebel

****768th AAA Gun Battalion**
April 1950—Lt. Col. Theodore H. Kuyper, Ill. N.G.

***229th AAA Group**
April 1950—Col. Edward Isaachsen, Ill. N.G.

****207th AAA Group**
April 1950—Col. George T. Stillman, N.Y. N.G.

****204th AAA Group**
April 1950—Col. John Barkley, La. N.G.

****251st AAA Group**
May 1950—Col. Anthony Long, Cal. N.G.

****35th AAA Brigade**
May 1950—Brig. Gen. Robert W. Berry

107th AAA Brigade
May 1950—Colonel John W. Squire, Va. N.G.

***340th AAA AW Battalion (M)**
May 1950—Lt. Col. George V. Selwyn, D.C. N.G.

****103d AAA Brigade**
May 1950—Brig. Gen. Russell Y. Moore, Conn. N.G.

1. To qualify for a listing on the JOURNAL Honor Roll, units must submit the names of subscribers and total number of officers assigned to the unit on date of application.
2. Battalions with 80% or more subscribers among the officers assigned to the unit are eligible for listing, provided that the unit consists of not less than 20 officers.
3. Brigades and groups with 90% or more subscribers among the officers assigned to the unit are eligible for listing, provided that the unit consists of not less than seven officers.
4. Units will remain on the Honor Roll for one year even though they fall below the 80% requirement during the year.
5. Lists of subscribers and statement of number of as-

signed officers must be submitted annually by units in order to remain on the Honor Roll.

6. Battalions with 90% of officers subscribing will qualify for one star placed after the unit's designation on the Honor Roll. Battalions with 100% subscribers will qualify for two stars.
7. Groups and brigades cannot qualify for one star but may qualify for two stars by having 100% subscribers.

(Units of all components will be listed together in the order of their percentages, beginning with the unit with the highest percentage.)

(Each unit listed on the Honor Roll will be given a one-year complimentary subscription to the JOURNAL.)
(Name of unit commander and date unit initially qualified for the Honor Roll will be listed with the designation of the unit.)

Civil Defense Planning*

By Lieutenant Colonel Barnet W. Beers, GSC

In recent months there has been considerable press and radio attention to the problems of civil defense, to the extent that the public is beginning to understand the problems involved. However, there still is an inclination to apply the term "civil defense" to a variety of activities ranging from anti-atomic defense to proposals for the formation of armed vigilantes for internal security purposes.

Through a process of world-wide war experience and world-wide postwar planning, "civil defense" has come into international acceptance as a term covering a broad field of measures for the protection and welfare of urban communities against enemy attack that succeeds in penetrating the preventive functions of military defense and internal security. Civil defense includes civilian participation in military passive operations short of bearing arms. For use within the Department of Defense, Secretary Louis Johnson, in a directive, dated 1 August 1949, defined the term "civil defense" to mean: "... all those activities and measures which are designed either (1) to minimize the effects which might otherwise be caused by, (2) to deal with the immediate emergency conditions created by, or (3) to repair any vital damage resulting from, an enemy attack which is successful in reaching a target within the United States, its territories, or possessions and which affects the civilian population. The principal activities in this field are (1) protection (such as shelters, fire services, sanitation, panic prevention and control, nonmilitary evacuations, dissemination of warnings, and the like); (2) relief (such as rescue, emergency feeding and housing, emergency medical care and the like); and (3) rehabilitation (such as restoration of essential services, utilities, communications, housing, and the like)."

When the Office of Civilian Defense, which operated during World War II, was discontinued in June 1945, the War Department considered that planning for civil defense should be progressively maintained. It was therefore decided that the War Department should prepare a study looking to the future status of this highly important part of our over-all defense. A board was appointed, headed by Lieutenant General Harold R. Bull. This board, after three months of exhaustive study, produced its report. The important conclusions of this board can be generally summarized as follows:

(a) Civil defense is a primary responsibility of civil government with principal preparations for operations at the local level; a recognition of state government responsibility for supervision of such activities within the state and with appropriate federal government coordination, assistance and support.

(b) Civil defense is an essential part of national defense; that the Armed Forces' primary mission of defeating an enemy should not be jeopardized by unnecessary diversion from this mission; but they should be responsible for technical advice and guidance in the fields in which they have special capabilities or knowledge and for rendering aid to civil authorities as prescribed by law and within limits that would not jeopardize that primary mission.

The "Bull Board" recommended: (a) a national policy group (such as the proposed National Security Resources Board); (b) a single permanent civil defense agency separate from the Armed Forces and, under a civilian director, to plan, organize, operate and in wartime to direct civil defense activities.

THE HOPLEY REPORT

Acting upon these recommendations, the Secretary of Defense in March 1948 established the Office of Civil Defense Planning and Mr. Russell J. Hopley, a business executive, was drafted to direct the newly formed office. This group, which was composed of some 43 experts in their fields, together with some 200 consultant members, selected because of their special ability in their respective fields, spent some eight months working on this report. As a result, the report "Civil Defense for National Security" was submitted to the Secretary of Defense on November 14, 1948. This report was given country-wide distribution. It was generally accepted as the last word on civil defense planning and although today this report has not been either officially accepted or rejected, it forms the basis for civil defense planning at federal, state, and local governmental levels. It has been acclaimed by most of the foreign nations that have proceeded in civil defense planning, several of them virtually adopting the plan in its entirety. The plan expands on detailed functions and suggests federal, state, and local organization to carry them out in time of emergency. Prepared principally by representative civilians, the "Hopley Report" proposals are not at variance with the principles developed by the military "Bull Board" a year earlier.

On March 3, 1949, the President directed the National Security Resources Board to assume leadership in planning for civil defense. Since that time considerable progress has been made.

After preliminary study and review of planning that had already taken place, the Board proposed a division of planning responsibility along lines that would utilize the experience and functional responsibility of existing agencies. Those activities generally classed as measures to meet wartime disasters were assigned for planning purposes to the newly formed General Services Administration with instruc-

*Reprinted with permission from the April 1950 issue of the *Armed Forces Chemical Journal*.

tion to coordinate the planning with other appropriate agencies of government. Through this means, scores of individual planning projects have been initiated in other agencies such as numerous studies on health and welfare problems conducted by the United States Public Health Service and assisted by the Department of Defense. Interdepartmental committees have been formed to plan civilian measures in the fields of radiological, chemical, and biological warfare defenses. Technical guidance for civil defense planners has been developed by the Department of Defense and Atomic Energy Commission for issuance by the National Security Resources Board. Examples of these are: "Medical Aspects of Atomic Weapons" and "Damage From Atomic Explosion and Design of Protective Structures"; and many others of a similar nature covering other elements of defense are under preparation.

A series of letters have been sent to the Governors of the states by the Chairman of the National Security Resources Board, urging initiative on their part in approaching the civil defense problem and providing for the channeling through them to the organized communities of further information as it is developed.

The report of the Office of Civil Defense Planning, entitled "Civil Defense for National Security" and commonly known as the Hopley Report, was referred to in one of these early letters as "a useful guide" to civil defense planners. The "Hopley Report" was officially distributed on 14 November 1948 to all Governors in sufficient quantities for a redistribution to municipalities within each state, and as a result, state and local planning in this field was considerably stimulated. Many of the states have passed new civil defense legislation paving the way for active planning and organization within the states, and most of the Governors have appointed a director of civil defense.

CIVILIAN-MILITARY TEAM

The National Security Resources Board has recognized the necessity for the development of a "civilian-military team" in many activities related to military defense. Many activities necessary in effective air defense and ground defense of the continental United States will require augmentation by civilian auxiliaries. Such activities are exemplified by the aircraft observer system to augment the radar screen established by the United States Air Force. Therefore, a program identified as "Civilian Participation in Active Defense" has been assigned to the Department of Defense. This program includes all activities controlled and operated by the military but which involve participation by civilians normally on a volunteer basis. In addition to the aircraft observer system, such activities might include auxiliary antiaircraft, auxiliary patrols for military purposes, including some activities of the civil air patrol, beach patrols, "auxiliary power squadrons" in conjunction with coast guard activities. In these activities the manpower considerations are coordinated with National Security Resources Board; civil defense agencies at the state and local levels are required to assist in the recruiting and administrative end; but the planning and the operational control are accomplished entirely by appropriate military departments.

"Civil air raid warning" is to be planned by the military,

integrated with air defense activities but actually implemented by civil (civil defense) authorities. Control of the warnings and regulations for conduct under various degrees of warning is to be prepared by the Department of Defense.

"Passive defense measures" required by military necessity, such as blackouts, dimouts, camouflage, electronic emissions control, and the like, are to be planned by the Department of Defense, including drafts of appropriate regulations; to be implemented and enforced by civil authorities.

"Protective construction" is generally the responsibility of the civil authorities, particularly as they pertain to shelter protection for the public. The military has the responsibility for leadership in protective construction as it applies to industrial protection for facilities essential to the war effort; and for technical advice and participation in the development of other shelter techniques and policies. Leadership and initiative in planning for protection of the general public presently remain with the agency of responsibility—National Security Resources Board.

It is a civil agency responsibility to plan for "unexploded bomb reconnaissance" (locating and identifying unexploded missiles; evacuating and isolating dangerous areas for civilian protection). It is a military responsibility to (a) neutralize or dispose of such unexploded missiles and to lend technical assistance and advice in planning the reconnaissance.

SUPPORT OF CIVIL DEFENSE

The problem of physical support of civil defense operations by military units requires considerable further consideration. The traditional dependence of civil authorities on the military in times of great disaster or other emergency creates a dangerous potentiality for diversion of the military forces from the primary mission of fighting a war. Under the existing constitutional and legal provisions for supplying military assistance to civil power, the three departments of the armed forces are prepared to render assistance to stricken communities to the greatest extent possible "within the means available and without jeopardy to their primary mission." Aside from the humanitarian reasons involved, the deep concern of the Department of Defense in problems of civil defense stems from this problem. It is considered highly essential to develop the highest possible civilian capacities in the field of organized self-protection without reliance upon military assistance. As a final echelon of support, the military forces will render all feasible aid in isolated incidents.

The first actual implementation of a major activity under the current civil defense plan is the Aircraft Observer Corps.

Surveillance of our air frontiers in order to detect unidentified aircraft is essential to an adequate system of air defense. For this purpose Congress has recently appropriated specific funds for the establishment of a radar screen. Despite the many developments made in the field of electronics there are still technical limitations in the capabilities of radar detectors. These, and other limitations imposed by considerations of topography and economy, make it neces-

sary to augment the radar screen by observers located throughout the surveillance area and by filter centers to screen, evaluate and facilitate the flow of useful information from the observer network to the air defense commanders. The value of an observer system is twofold: first, it increases the capability of the air defense forces to prevent or counter air attacks upon this Nation; and second, it provides a basis for initiating air raid warnings to civil defense officials and to the general public. The personnel requirements of an observer and filter system are numerically and economically beyond the capabilities of our military organization and dictate the establishment of such a service as a civilian volunteer organization. This is in consonance with the traditions and practices of this country to place major dependence upon its civilian army in the event of war and even greater dependence on wholehearted volunteer civilian participation in activities supporting the military effort.

The formation and establishment of an aircraft observer system after a war emergency has been forced upon us is entirely impracticable. Its chief value is in its readiness to operate at any time. Although the training of individuals who will participate in this activity is neither arduous nor particularly time-consuming, the development and establishment of a completely organized and well-trained corps requires many months of progressive effort. It has, therefore, been decided to organize this observer system now, to establish the observation posts and filter centers, to train the personnel and then place them in a stand-by status.

OBSERVER SYSTEM A REALITY

The plan for the establishment of an aircraft observer system across the United States is not merely a paper plan. It has been thoroughly "war-gamed" and tried in a full-scale operation. Observation posts and filter centers were established throughout the greater portion of ten northeastern states last summer; personnel was recruited and trained and a civil air raid warning system was installed. The entire installation was tested last September in a ten-day exercise conducted by the United States Air Force and known as "Operation Lookout." This exercise proved the efficacy of a civilian observer system; it proved the feasibility of creating such a system through volunteer participation, and it proved the practicability of utilizing existing communications media in an integrated civil air raid warning system. As a result of "Operation Lookout" there is now established in parts of ten states in our northeast area a stand-by organization and there has been evolved a tried and tested plan for the installation of an Aircraft Warning Service incorporating observation posts, filter centers and warning system which will effectively assist in the air defense of the United States and give maximum warning to its citizens and civil defense forces in the event of an emergency.

The current phase of the Aircraft Warning Service program includes the completion of the installation in those "Lookout" states which were partially organized for the

original test and the expansion of this service in fifteen additional states in the northeast, Great Lakes and West Coast areas. It involves the establishment of approximately 8,000 observation posts and 26 filter centers. To man these activities upwards of 160,000 civilian volunteers will be required. Adhering to sound principles of following established channels of civil government, the governors of the states involved have been requested to assist in the implementation of the program by assigning to their civil defense or other specially created headquarters the responsibility for recruiting and administering the organization within their respective states. The training and operational control will be the responsibility of the United States Air Force.

Observation posts will be located in cities and towns at intervals of approximately eight miles. The United States Air Force designates the towns according to a pattern of desired coverage. The states are requested to name a supervisor for each location and the supervisor is to assume the responsibility for locating the post where the various requirements of visibility, communications and accessibility can be satisfied. Existing telephone facilities will be used for observer reports; aside from priority service given to "flash" calls from the subscriber phone at the designated observation post, no special telephone facilities will be provided. The post supervisor will be responsible for recruiting and maintaining an organization sufficient in number to man the post continuously in an emergency. Filter centers will be installed by the United States Air Force at designated places. Filter center operations will be recruited under the direction of the state headquarters, and volunteers for this service will be trained at the centers by cadres of Air Force personnel. Special air raid warning telephones will be installed by the Air Force at designated "key-point" centers where air raid alerts, transmitted from Air Defense Control Centers, may be received at any time for dissemination to civil defense personnel and to the general public throughout the warning areas.

Several years of careful planning have gone into the formulation of this single observation activity. It has been most carefully planned to avoid inroads upon a manpower pool that could very easily be overtaxed in a wartime period. Many more months will be required to complete its organization and the training of its individual participants. This explains the expediency—in fact the necessity—for its present establishment and maintenance on a stand-by basis. Its function in conjunction with the radar screen will be to make the tactical air defense possible. In addition, it will furnish information on which a civilian air raid warning can be based. As a tentative measure, the military is installing effective communication arrangements whereby responsible civil officials in each of the 48 states can be given the same early warning available to military commanders, in the event of any attack by air. This warning system can be quickly expanded to a complete public warning system when the protective services of the civil system achieve a capacity for taking effective action.



Status of Training Literature

The following list of training publications now under preparation, being printed or recently published is compiled specifically for AAA personnel.

A single asterisk (*) indicates that the project is to be submitted to, or is now at, the OCAFF for review prior to printing. Unmarked projects will be submitted through the proper channels to, or are now at, TAG for printing by the responsible Chief of Arm or Service concerned. New literature projects are indicated by N, Revisions by R, and Changes by C and the number of the Change.

Dates in the Status column indicate the following:

- For one asterisk (*) projects, it is the approximate date the manuscript will be submitted to OCAFF for review.
- For unmarked projects, it is the approximate date the manuscript will be forwarded to TAG approved for printing.

The average length of time required to print and distribute a manual, after its receipt in final form by TAG, is four (4) months.

MANUAL No.		TITLE	PREPARING AGENCY	STATUS
FIELD MANUALS				
44-1*	N	Antiaircraft Artillery, Employment (Revision of 4-100)	AA&GM Br Arty Sch	January 51
44-2	R	Antiaircraft Artillery, Automatic Weapons	"	At Printer
44-4*	R	Antiaircraft Artillery, Guns	"	OCAFF Review
44-27	R	Service of the Piece, 90mm AA Gunmount M2 (4-127)	"	OCAFF Review
44-28	R	Service of the Piece, 4.7 Inch AA Gun (4-128)	"	OCAFF Review
44-57*	C2	Adds—Transport by Air	AA&GM Br Arty Sch	Indeterminate
44-60*	C3	Adds—Transport by Air	"	Indeterminate
TECHNICAL MANUALS				
9-235*	R	37-mm AA Gun Matériel, Organizational Maintenance	C of ORD	August 50
9-252	R	40-mm Gun (except self-propelled)	"	OCAFF Review
9-372*	R	90-mm Gun M2 & AA Mount M2	"	September 50
9-380*	R	120-mm Gun M1 & AA Mount M1, M1A1	"	September 50
9-649*	R	AAA Cable Systems, M1, M3, M8	"	July 50
9-671*	R	Directors M9, M9A1, M9A2, M10, Organizational Maintenance	"	September 50
9-1235	R	37-mm AA Gun Matériel, Field and Base Maintenance	"	August 50
9-1252	R	40-mm Automatic Gun	"	OCO Review
9-1370	R	90-mm AA Gun Matériel (1370 AB)	"	At Printer
9-1372A	R	90-mm Gun M2 & AA Mount M2	"	September 50
9-1372B	R	Comb Fuze Setter, Rammer, M20 & Amplifier (For Gun Mt M2)	"	At Printer
9-1380	R	120-mm Gun M1 & AA Mount M1	"	September 50
9-1609	N	Computing Sight M7 & M8A1 (for 40-mm Carriage M2)	"	OCO Review
9-1659	R	Directors M5A1, M5A2, M5A3	"	At Printer
9-1671 A&B	R	Directors M9, M9A1, M9A2, M10, Field and Base Maintenance	"	OCO Review
9-1682	N	Remote Control System M12	"	At Printer
9-1684	N	Local Control System M16	"	September 50
9-1901	R	Artillery Ammunition	"	OCO Review
9-2604*	N	Inspection & Adjustment of Fire Control Inst	"	March 50
20-240*	R	Meteorology for Artillery	AFF Bd 1	OCAFF Edit
20-241*	N	Meteorological Tables for Artillery	"	OCAFF Edit
44-234	N	AAA Service Practice	AA&GM Br Arty Sch	At Printer
44-260	N	Flak Analysis	"	At Printer

THE NEW MAP GRID SYSTEMS*

Compiled by Major Donald D. Dunlop, Infantry

The message was brief and to the point.

"CP 1st Inf closed old location. Opened 36519276 at 030915 Apr 50."

Here's the report on the new location of a command post. The time date group seems to be in order. But wait—what about that grid coordinate? That "36519276"? That's a new way of writing coordinates, isn't it? The answer is "yes" and "no." For those of us who have worked with maps using the British grid it's old stuff—that business of omitting the parentheses, decimals, and dash. Effective immediately, we'll omit them when using other systems. That constitutes one of the items included in the recent authorization of two new grid systems by the Department of the Army.

As of 29 December 1949 the Army, Navy, and Air Force have adopted for joint use the Universal Transverse Mercator (UTM) and Universal Polar Stereographic (UPS) grid reference systems. The same systems will be used interchangeably by the Army.

The full titles of these grid systems shouldn't bother us too much. In this age of alphabetical terminology we can assume that UTM and UPS will be the titles commonly used. Analyzing these two titles we deduce that with the word "Universal" excepted, the titles are derived from the name of the projections used on maps. These two projections are:

1. *The Transverse Mercator projection between 80 degrees north latitude and 80 degrees south latitude.*
2. *The Polar Stereographic projection for the northern and southern polar regions. In both regions this is a circular-shaped area centered on the poles and having a radius of 10 degrees.*

Inasmuch as the UTM grid system will apply to all portions of the earth's surface except the two polar regions, it is the one with which we shall be most concerned.

Suppose we analyze a complete UTM grid coordinate such as 16SFL 35216659. The "16SFL" breaks down into two bits of information—"16S" and "FL." The "16S" is a grid-zone designation. These grid zones are 6 degrees in an east-west direction and 8 degrees in a north-south direction. The "16S" tells us what particular grid zone is referred to. In other words, out of an area covering practically the entire earth's surface, "16S" confines us to one particular 6 degree by 8 degree portion of that area. Any other such grid zone between 80 degrees north latitude and 80 degrees south latitude is expressed in a similar manner—a number followed by a letter. Just how the designations are determined is something for the map maker to worry about—we'll have the appropriate grid zone designation furnished on the margins of our maps.

Next we come to "FL" which gives us the identification of a 100,000 meter square within our grid zone. This further confines our area of reporting to a square which measures 100,000 meters on a side. All such squares are indicated by two letters. The two letters constitute the 100,000 meter square identification. Again, we needn't concern ourselves with how the identifying letters were determined. They, too, will be furnished on our map margins.

The following shows the form in which the grid zone designation and the 100,000 meter square identification will probably appear on the margin of the maps we will be using.

Zone 16 S
100,000
Meters Sq.
FL

Finally we come to the digit part of our coordinate—35216659. It means the same thing as (35.21—66.59). It has merely been simplified and shortened by the deletion of the parentheses, decimals, and dash. Nothing complicated about that, is there? We'll always have an even number of digits, the first half (the first four numerals in this case) indicating the RIGHT reading and the last half representing the UP reading. On a large scale map—1:25,000 or 1:50,000—the coordinate given above designates a location to the nearest 10 meters. We say "meters" because grid interval appears in meter graduations on military maps currently being published. If we wanted to express the same location only to the nearest 100 meters we would write: 352666. And, of course, the designation of the 1000 meter grid square in which our location is included is expressed as: 3566.

There is no change in the method of determining or plotting grid coordinates. We just express them in a slightly different manner.

Now the question arises: will we be expected to give a complete UTM grid coordinate in reporting positions—to include the grid zone designation and 100,000 meter square identification? Except for unusual situations the answer is NO. The normal coordinate used within a division and lower units will consist only of the digit part of the reference. Just when to include the grid zone designation and 100,000 meter square identification depends on the size of the area of activities and on the interval between the grid lines.

Generally speaking, the grid zone designation (such as 16S) will be omitted if reporting is confined to an area which does not exceed 18 degrees north-south by 18 degrees east-west, centered on the point of reference. That is a very large area—18 degrees representing approximately 1,240 miles at the equator. Such distances may involve a high

*Reprinted with permission from April, 1950, issue of *Infantry School Quarterly*.

level headquarters, but most of us will rarely be concerned with them. However, in case we do cover very large areas, a grid reference box shown on the margin of the map will indicate the maximum area beyond which the grid zone designation has to be included in reporting.

The 100,000 meter square identification is omitted under the following circumstances:

1. *If reporting from a 1,000 meter grid (a large scale map) is confined to an area not exceeding 100,000 meters east-west by 100,000 meters north-south (not necessarily a square bounded by 100,000 meter grid lines).*
2. *If the area does not fall within 25 miles of a grid zone junction.*

The 100,000 meter square identification can never be omitted under the following circumstances:

1. *If reporting from a map containing a 10,000 meter grid interval (map of scales 1:100,000 and smaller).*
2. *If more than one grid zone or overlapping grid zones appear on the map.*

From this information we logically deduce that in divisions and lower units the expression of coordinates will normally be by digits only.

Although the UPS grid system does involve a different map projection and covers just the two polar regions, the principles involved are similar to those pertaining to

the UTM grid system. Coordinates are expressed in the same manner and maps of the area will furnish the grid zone designation and 100,000 meter square identification.

Obviously, replacing our old grids with the UTM (UPS) grid is a sizable task that will take a long time to finish. Right now we are in the early part of this transition period. Necessary changes to Army manuals are being prepared. Despite the similarity of expressing coordinates in the UTM (UPS) and British Grid systems, the UTM and UPS grids will gradually replace the various British grids.

To the map reader all of the foregoing information can be boiled down to four basic items:

1. *Grid interval is in meters.*
2. *Coordinates are expressed without parentheses, decimals, and dashes.*
3. *Military maps published in the future will include, as an item of marginal data, the appropriate grid zone designation and 100,000 meter square identification. These items are to be used only under circumstances outlined in this article.*
4. *We are presently in a transition period during which time old grids are being replaced by the UTM and UPS grid.*

All of this adds up to one more big step toward simplification and unification.

Keep an eye peeled for the revised manuals.

ABOUT OUR AUTHORS

General Sir Frederick Pile, author of "ACK-ACK," has had a long and colorful career in the British Army. In World War I he commanded a tank battalion and in Egypt he headed an Infantry Brigade. As an officer of the Royal Artillery, he first came into the antiaircraft artillery in 1937 when he assumed command of Britain's 1st Anti-aircraft Division and in 1939 he became Commander in Chief of the AAA Command in England where he served throughout the war in charge of the AAA defense of Great Britain.

Lieutenant Colonel Dorsey E. McCrory was an honor ROTC graduate from Texas A & M in 1939 and was commissioned a second lieutenant of Infantry. He served in the ETO in the 95th Infantry Division where he commanded a heavy weapons company and served in various staff sections in the Division. He is presently assigned as Infantry Liaison Officer to the AAA & GM Branch of The Artillery School at Fort Bliss, Texas, where he also instructs in the Department of Tactics.

Major Paul F. Wilson entered active duty in September 1941. He was in Italy, France and Germany during the war with Field Artillery units and graduated from the Artillery Officers' Advance Course in 1948. He is now assigned to the Depart-

ment of Gunnery at The Artillery School, Fort Sill, where he conducts courses of instruction for Air Force pilots in the adjustment of artillery fire from high performance aircraft.

Captain W. L. Harrelson, GSC entered the Regular Army in 1944 as a distinguished military graduate of The Citadel, the military college of South Carolina. He served in Japan for nearly three years and received an M.A. in journalism from the University of Wisconsin in 1949 under the Army's civil schooling program. He is presently assigned to the Troop I & E Division, Department of the Army.

Colonel Beers, who now serves as Assistant for Civil Defense Liaison in the Office of the Secretary of Defense, commanded the Civil Defense Team of the U.S.S.B.S. which investigated civil defense in Germany, Great Britain and Japan in 1944-45. The next year he became Civil Defense Officer, Army General Staff, and Recorder of the War Department Civil Defense Board commonly referred to as the "Bull Board." In March, 1948 he was assigned as Executive to Russell J. Hopley in the Office of Civil Defense Planning where he served until August, 1949 at which time he assumed his present responsibilities.

Undersea Warfare and Sea Power*

By Rear Admiral C. B. Momsen, U. S. Navy

A student of undersea warfare must understand that the electromagnetic waves of radar and radio do not penetrate water to any useful degree. Also, that sound waves through water do not extend to the air. Thus, any communication between air and water must be through a transfer system from one to the other. The radio and radar antennae must be above the surface of the water and the sound transducer or hydrophone must be placed below the surface. As an example, the sonobuoy is a device which may be dropped into the water by an aircraft. A hydrophone sinks below the surface, and an antenna attached to a buoy extends above the surface. The hydrophone picks up the noise made by the submarine and it transmits this noise by an automatic radio set to the airplane. Sonobuoys were used quite successfully to assist aircraft in locating submarines known to be in a general area.

During World War II the Germans built 1162 submarines. Of these 751 were destroyed. More than 13 million tons of shipping was sunk. Perhaps the greatest single factor contributing to the defeat of the submarine during World War II was radar. The reason for the effectiveness of the radar can be attributed to a tactical weakness of the submarine. The submarine operating submerged had to rely on a storage battery for power. When the storage batteries became exhausted it was necessary for the submarine to return to the surface, and by means of diesel engines, recharge the batteries before submerged operations could be resumed. A submarine, while on the surface, is a very ineffective naval unit, and when it was discovered, particularly by aircraft, it did not have sufficient time to submerge and escape.

By 1943 the German submarine losses became so great that it was necessary for them to adopt a means of preventing discovery by radar. As a consequence, they adopted the Dutch developed snorkel. The snorkel consists of a vertical pipe extending up from the hull through which air may be drawn for supplying internal combustion engines with necessary air. The tip of the snorkel that was required to be above the surface of the water, presented a very small target and submarines were then able to keep their hulls completely submerged for days or even weeks at a time by using the snorkel. The adoption of this defensive measure by the German submarine reduced its mobility, not only in speed of advance, radius of action, but also in its ability to find targets. The submarine was also handicapped in its ability to navigate using celestial objects and to communicate with its own headquarters. While it is true that after the adoption of the snorkel, submarine losses were severely reduced, it is also true that sinkings of merchant ships dropped to about one-fifth of what they had been prior to this change. The use of the snorkel had little effect upon World War II.

What about our Undersea Warfare problems of the future?

If another war comes, submarines could be used against us for

*Minelaying,
Attacks against shipping and naval units,
As radar pickets to give advanced warning of air raids,
As troop carriers,
Cargo carriers, and
Guided missile launchers.*

The type of submarine to be dealt with would be an improvement over the World War II type. Germany, facing defeat of their special naval arm, developed this new type of submarine. In addition to the snorkel described, the Germans developed new long-range torpedoes, streamlined their hulls, and increased the battery power which more than doubled their submerged speed. This increased speed enabled them to escape from surface ships and more effectively to attack convoys. It is significant that in streamlining to gain high speed the large caliber deck guns had to be abandoned, and if we are to face the high speed submarine in the future, we will not at the same time, be concerned with attacks on ships by gunfire.

These developments, fortunately for us, came too late in World War II, for by then the German military machine was crumbling. However, this new type, which we now call the intermediate type, caused great consternation among naval staffs, for in one stroke the position of superiority of the submarine had been restored.

There were not a great many of these new craft built and since it takes quite a while to build new types, we have had time to work up defenses against it. Since World War II a great deal of effort has been placed upon the solution of this knotty problem.

Defense against submarines will be along these lines:

Aerial bombardment of enemy submarine bases and building yards, if completely effective, would be a solution. Note that this requires carriers with their supporting ships and land based planes with their supporting bases. Experience has taught us, however, that in spite of great effort in bombing, only a limited number will be destroyed by this means. Bombing of U-Boat plants during World War II resulted in the production loss of 152 out of 1162. Actually 111 were severely damaged. 99,265 tons of bombs were used.

Mining of harbors and channels if completely effective could prevent submarines from getting to sea. Mining requires aircraft, surface ships and submarines. We are not so naive as to believe that this can be entirely successful and we feel certain that some would escape to the open sea, but a significant number will be sunk.

Next, we could place our submarines across the passages

*From an address in Springfield, Mass., April 12, 1950.

of egress to the open sea. This would require submarines and supporting air and surface units. Again, only a percentage of enemy boats would be intercepted.

Regretfully, we must face the fact that we would have submarines prowling the high seas searching out and threatening our merchant ships and fleets.

If they remain submerged at all times, making use of the snorkel, it would be very difficult for our aircraft and ships to discover them. Even so, extensive air cover, sufficient to keep the submarines submerged would produce important results in reducing their mobility.

When those which have overcome all of these difficulties do find targets, their capability to strike effectively is very great, for the range of the modern torpedo is so great that they outrange our present detection devices.

The Navy has hundreds of research projects under study. These include weapons, detection devices and new and novel methods of using them. Some of these projects look encouraging, but those of you who have concerned yourselves with research are all too familiar with the statement that "if this one little difficulty could be overcome it would work."

It is, of course, our hope to improve the effectiveness of each of the antisubmarine measures. We are always seeking better aircraft and better bombs with more accurate delivery in order to increase the number of submarines destroyed at their source.

We are continually improving mines to be used against the submarine.

In both fleets, submarines are especially designated to evolve the best techniques of destroying enemy submarines. It is well to point out that submarines operating in ambush in fixed positions are able to remain very quiet, whereas the enemy submarine intent upon reaching his hunting ground is committed to movement and movement means noise. There results a battle of noise levels in which the antisubmarine submarine holds the high cards. We are now constructing a new type of submarine called the SSK—submarine killer. It is around this type that we propose to build the submarine defense against the submarine. I can say that from my own experience there is no foe that strikes more terror in the heart of a submariner than an enemy submarine operating in the same waters. It is somewhat analogous to two blindfolded antagonists armed with baseball bats, each waiting for the other to break silence.

We must have sufficient antisubmarine warfare aircraft, both land based and carrier based, patrolling the infested sea areas to ensure that submarines remain submerged continuously in order to reduce their mobility. We will require a large number of surface ship escorts to defend our convoys and task forces if they are located by enemy submarines.

We have plans for the defense of our harbors against the penetration by enemy submarines and other types of sneak craft.

This is the general picture of our various methods of dealing with enemy submarine threats. All of these methods will contribute to reduction of the threat. These methods involve the use of powerful striking forces, land based aircraft, advanced bases, amphibious forces including Marines to take and hold advanced bases, logistic support fleets to

provide beans, bullets and fuel, submarines, patrol craft, in fact all elements that make up a balanced fleet. Indeed, to say "provide for only antisubmarine forces," is a masterpiece of misunderstanding for when all antisubmarine forces are provided we will have the United States Navy in size and composition as advocated by naval leaders.

The most difficult part of the problem that confronts us is, defending ships from attack by those submarines which are able to reach their targets.

This part of the problem has been made most difficult by the recent increases in the effective range of the submarine torpedo.

There are three types of torpedoes:

- a. *Aimed;*
- b. *Target seeking; and*
- c. *Pattern running.*

During World War I and most of World War II the primary torpedo used was the aimed type. Since this torpedo once launched could travel only on a preset course, considerable accuracy was required to solve the fire control problem in order that the relative motion of ship and torpedo would result in collision. Generally, ranges of not more than 1500 yards were used. As a rule our detection equipment was capable of discovering the submarine before torpedoes were launched. Consequently, the antisubmarine ships had a fair chance of developing the first attack.

New types of torpedoes can be fired well beyond the range of detection. These are not accurately aimed but their hitting accuracy is obtained by other methods. The target seeking type utilizes the noisy put-put of a ship's propellers to attract it to its target.

The pattern running torpedoes are directed on a straight line to the vicinity of the target, then through the operation of a cam, weave a preset pattern to cover a large area.

Either the pattern running or the target seeking torpedo can be fired from ranges far greater than the aimed type. Also, unfortunately, they can be fired beyond the present range of the ship's detection devices.

DETECTION DEVICES

The question naturally arises, can we increase the ship's detection range? As has been stated, radio and radar cannot be used under water. Magnetic detection has very limited ranges and is useful only in a restricted way. The mainstay of submarine detection is by sound.

Sound falls into two classifications:

- a. *Passive*
- b. *Echo ranging.*

Passive sound is merely listening for a source of noise. Great progress has been made in eliminating this noise source by silencing submarines and their machinery. Today, a submarine may, under certain conditions, proceed at a fairly high speed without making noise that can be heard at useful distances. Consequently, we must rely principally upon echo ranging for detection.

The speed of sound, travelling through water, is about 1600 yards per second. It is the "About" that makes trouble

for the speed of sound varies with the temperature of the water. Except in rare instances, when the water is a uniform temperature, the sound beams travel along curved lines. A beam of sound energy aimed at a submarine a few thousand yards away may miss it entirely because of this effect.

Many of our submarines operating against the Japs in the Pacific came home only because they took advantage of this phenomenon and escaped detection below a temperature layer.

Today, our most serious problem in antisubmarine warfare revolves about this question of range of detection. We have a large number of research projects which deal with it. Until it is solved we will be certain to lose heavily against enemy submarines. On the other hand if we do solve it we will be able to drive submarines off the seas. I have reason to believe that we will solve this problem, and if my prediction is correct, submarining will become a mighty dangerous business.

Now let us turn our attention to another undersea warfare problem, the mine.

Most people do not appreciate the terrible possibilities of the mine. Mines have sunk more ships per dollar expended than any other weapon. Of course it may be argued that mines can only be used in limited depths of water; but after all, ships must always go through such waters eventually before arriving at their destinations.

The old moored mine is still useful even tho it can be easily swept. In the first place the mere presence of mines

causes an enemy to divert a large part of his strength to provide and operate sweepers. Secondly, in areas where air cover can be provided sweepers cannot operate. In general moored mines are used defensively.

Ground influence mines, many varieties of which were developed in the last war, are much more difficult to sweep. Several influences are used to actuate the mine. The principal types are acoustic, magnetic, and pressure. The acoustic may take the form of a simple hydrophone. The noise of the ship's propulsion sets it off. The magnetic takes advantage of the natural magnetic field surrounding ships and the pressure type uses the pressure changes in water caused by ship's motion. All of these influences can be produced by artificial means for sweeping. When counters (clock mechanism that regulates the number of times the particular influence must be produced before the firing mechanism functions) are used and when the combination of two or three of the influences is employed, sweeping becomes a problem as complicated as opening a combination safe. It is time consuming and the cost of the sweeping effort is all out of proportion to the cost of the mines.

Mines can be laid by aircraft, surface craft, and submarines. The aircraft is the best mine layer. It can penetrate enemy waters that ships cannot reach and it can replenish old fields which ships could not enter. On the other hand, aircraft can be observed and its mine drops can be spotted. The submarine is a most useful mine layer because it can do its dirty work unobserved.

"ACK-ACK"

By General Sir Frederick Pile, British Army

Here, for the first time, is the true story of Britain's antiaircraft defense during World War II. General Pile gives a clear, accurate portrayal of Britain's antiaircraft defenses—a story of trial and error, of improvisation and ingenuity, of battles with the people who thought that "ack-ack" was not being conducted properly.

It is a story of heartbreak and of final triumph. By 1942, antiaircraft defense had reached a peak of organization and brilliantly conceived installation, and both its technique and equipment were far ahead of the Germans'. General Pile pays tribute to the civilians and the military who were responsible for maintaining "ack-ack." In a chapter devoted entirely to the American contribution to Britain's antiaircraft defense, he pays tribute to the part played by American allocation of S.C.R. 584s and to General Eisenhower who took a personal interest in maintaining a defense against the flying bombs.

Here is the story of "Overlord," Dunkirk, the Battle of Britain, Churchill's part in the organization of the antiaircraft barrages, flying bombs, the home guard, all told with realism, courage, and the firsthand knowledge of the man who was almost singlehandedly responsible for antiaircraft defense in Britain.

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AAA Activities at Fort Custer, Michigan

After nearly two years of hibernation, Fort Custer, Michigan is back in business. November 1949 marked the arrival of the first elements of the 22d AAA Group from Fort Bliss, Texas, and the end of December saw the last battalion de-train at its new home. The new year found 22d AAA Group personnel busily engaged in establishing themselves at their new station. Of course much advance preparation had been made by Fort Custer's small service unit prior to arrival of the AAA units, but even more was yet to be accomplished by the artillerymen after they arrived. Barracks that had not been lived in for over two years had to be prepared for occupancy, mess halls which had been closed for even a longer period were to be readied for use, heating systems checked and firemen trained, supplies of all kinds obtained, telephones installed; the tasks seemed never ending.

Dependents' housing posed still another problem. Available family type quarters on the post, for both officers and enlisted men, were few. There were some 150 sets of quarters on the post, but all save 25 sets were occupied by personnel from near-by Percy Jones General Hospital and the Fort Custer Service Unit. Nearly three hundred housing units were needed for married personnel of the 22d AAA Group! To help solve this problem, Colonel Harry R. Boyd, 22d AAA Group Commander, and new Commander of Fort Custer, authorized establishment of a Dependents' Housing Office for the purpose of listing off-post rentals. Battle Creek's newspaper and radio stations were very cooperative in appealing to property owners to list rentals with the housing office. The response was gratifying—some property owners offered rentals that had not been let since Fort Custer's peak wartime activities, and others converted their homes into apartments. As a result, all 22d AAA Group families were housed. Some, of course, are not as comfortably situated as they would like, and others are paying what they believe to be excessive rents. Another long step has been taken, however, toward completely solving this problem. A contracting firm is now working at full speed to convert 56 standard two-story 63-man frame barracks into four-unit apartment houses, a total of 224 new sets of family-type quarters. Completion of this project is scheduled for late July, at which time it is expected that government quarters will be available for all eligible married personnel stationed at Custer.

Custer billets few other units except those of the 22d AAA Group, namely: the 5010th Area Service Unit, the 250th General Hospital Enlisted Detachment, and Detachment 5 of Percy Jones General Hospital.

Units of the 22d AAA Group include: Hq & Hq Btry of the Group; the 502d AAA Operations Detachment; the 8th AAA AW Bn (SP), commanded by Lt. Col. George E. McCormick, Jr.; the 30th AAA AW Bn (Mbl), commanded by Major Joseph C. Baer; the 79th AAA Gun Bn (120mm), under command of Lt. Col. Henry W. Ebel; the 504th AAA Gun Bn (90mm) with Lt. Col. Charles E. Roden, Commanding; and the 9th Signal Radar Maintenance Unit. One other unit, the 45th RCAT Det., is

scheduled for arrival in early May from Fort Bliss to complete the 22d AAA Group organization.

One of the most pressing problems was to establish a range for the firing of primary weapons. Fort Custer's 14,000 acres was suitable for other phases of training; small-arms and terrestrial machine-gun ranges were adequate, but no antiaircraft firing could be done. After much consideration, a firing point near Sheboygan, Wisconsin, along the western shore of Lake Michigan was decided upon by Fifth Army. Camp Haven, as this point has been named due to its relative proximity to the community of Haven, Wisconsin, was opened on 16 March when advance elements of the 22d AAA Group arrived for the purpose of establishing a battalion-size tent camp. The weatherman worked overtime to hinder operations. Jackhammers had to be used initially to make holes in the hard-frozen ground for the wooden tent pegs. Later, thaws produced deep mud which, coupled with windstorms, necessitated practically rebuilding the camp on two occasions. Notwithstanding these difficulties, the first battalion listed to conduct its firing practice (the 30th AAA AW Bn, Mbl), arrived at Haven as scheduled on Sunday, 2 April. Difficulty was encountered in moving their 40mm guns through the heavy mud to the firing line; winches were employed to draw them into position. During the firing, frequent leveling of guns and directors was necessary due to the very unstable footing. In spite of this, the 30th tallied excellent scores on their practice.

Movement of the gun and self-propelled battalions the 325 miles from Custer to Camp Haven presented still a different problem. State laws and city ordinances prohibit the movement of these vehicles on public highways. Consideration was given to use of rail, and a combination of rail and water transport, but these methods were ruled out because of the high cost. In the interest of economy, and for experimental purposes, civilian trucking concerns with heavy duty trailers, were awarded contracts to move this equipment. Believing the firing could be efficiently conducted without the full equipment of each battalion, it was decided to move only a minimum of essential equipment. The first unit whose equipment was moved to Haven in this manner was the 8th AAA AW Bn (SP). Their twenty-four self-propelled vehicles made the journey without incident. The two gun battalions, which have yet to fire, will be transported to Haven in a similar manner.

Fort Custer will be host to numerous civilian component units throughout the summer. National Guard units are already making week-end use of Custer's rifle and machine-gun ranges. Beginning 20 May, Custer's training facilities will be available to several Michigan units of the Organized Reserve Corps for week-end training. Families of ORC members have also been invited. Quarters for them will be provided, and Custer's wealth of recreational facilities will be available for their pleasure. The 22d AAA Group will furnish AAA Instruction Teams for duty with the civilian components during their summer training periods at Camp Haven, Wisconsin; Camp Ripley and Upper Red Lake, Minnesota; and as far away as Camp Stewart, Georgia.

AAA Activities at Fort Ord, California

The 68th AAA Group, Colonel William C. McFadden, Commanding, with the 60th AAA AW Bn (M), the 502d AAA Gun Bn (120mm), the 500th Operations Detachment and the 2d Signal Radar Maintenance Unit, arrived at Fort Ord, 17 and 18 September 1949, from Fort Bliss, Texas. The 450th AAA AW Bn (M), joined the Group 29 October 1949.

Shortly after arrival, a formal training schedule was put into operation. It stressed the subjects that the Group Commander felt had not been given enough time during the interim training program. Battery reconnaissance, selection and occupation of position problems of eight-hour duration were started late in October. This type of practical field work has been continuous since then, varying in size from one battery to a group problem of 72 hours' duration.

Facilities for antiaircraft artillery field problems at Fort Ord are limited but the available terrain is excellent for field maneuvers up to battery level. Cross-country movement training is easily accomplished and there are enough wooded areas for concealment.

The battalions will have completed annual firing of organic small arms by 1 June 1950. The facilities for this type of training are excellent.

There are no existing antiaircraft artillery firing ranges near Fort Ord, but it is hoped that approval will be obtained to establish one over the water in the near future. During World War II, antiaircraft artillery AW units conducted firings from the proposed positions.

Meanwhile, the Group is going ahead with plans for service and record target practices at Camp Irwin, California, to be held 1 June through 15 July 1950. This period will also be given, in part, to Regular Army support of California Officers Reserve Corps units undergoing summer training.

Preparatory training for this firing has been supplemented by the excellent cooperation of the Monterey Naval Air Station through daily tracking and attack missions flown by Navy pilots.

Fort Ord has afforded the enlisted men of the Group and attached units the best housing it has had since its reactivation. The two-story-type barracks are far more desirable than the hutment type at many stations. Fort Ord made

an immediate proportionate share of family-type quarters for officers and enlisted men. All personnel who desire available government quarters have them.

The 4th Infantry Division has integrated the 68th AAA Group completely in all of its social and athletic programs. The many installations on the post give a varied, unusually active off-duty program for the individual soldier. There are three theaters at Fort Ord, one at the Navy Line School and one at the near-by Presidio of Monterey. An excellent gymnasium and swimming pool on the post are the scene of many organized events and afford many pleasant hours of recreation to the individual. A post gun club and riding stables are available to all interested personnel. Other facilities include a "Million Dollar" soldiers' club, a dancing studio, hobby shops, and a Little Theater group.

Off-post facilities include four excellent golf courses, hunting, superior fishing and boating. Monterey is called the Golf Capital of the World.

During the recent basketball season, the 68th AAA Group competed in the lively post tournament and is justly proud of winning the "Regimental Championship." The same team went on to win the Southern Division Sixth Army "Class B" Title.

The Group has also successfully participated in the post boxing program. Two members of the 450th AAA AW Bn went to the Army-wide boxing matches after having won the Sixth Army title in their weight class.

Near-by Monterey Peninsula College offers evening courses for all. In fact, the surrounding communities have wholeheartedly put all of their facilities at the disposal of Fort Ord personnel.

Those desiring off-post quarters have had little difficulty in finding suitable rentals. The communities are all very progressive and offer the best shopping facilities found outside of metropolitan areas. San Francisco is 100 miles to the north; Los Angeles 350 miles to the south.

Sixth Army runs a recreation center for enlisted personnel at the Presidio of San Francisco, with quotas to Fort Ord, which offers a three-day stay in that area at no expense for transportation, quarters, messing, and many recreational events.

To sum up briefly, the 68th AAA Group finds Fort Ord a very desirable station for training—and play.

AAA Activities at Fort Benning, Georgia

The 3d AAA AW Bn (SP) under the Command of Lt. Colonel John D. Stevens arrived at Fort Benning, Georgia, in the latter part of November 1949, having been assigned as an organic unit of the 3d Infantry Division, and a member of the 3d Infantry Division Artillery. As soon as the equipment train from Fort Bliss arrived, the battalion went into the field for three days on a division problem. This was the first combined arms exercise of the battalion in which

it furnished AAA AW protection for field artillery and division installations.

On return from the field the battalion started preparation for participation in the recent Caribbean Joint Operation "Portrex." On 4 January 1950 the battalion departed by train for Charleston, South Carolina. Personnel and equipment were embarked on APA's and LST's sailing for Norfolk, Virginia. Two weeks' amphibious training was con-

ducted at Little Creek by Troop Training Units FMF, Atlantic. Then all personnel moved to Camp Pickett, Va., to undergo three more weeks' training, to include a review of basic subjects and individual and sectional training. Progressive embarkation of personnel from Camp Pickett was started on 14 January. When the entire battalion was loaded at Norfolk, Va., its personnel were on nine different ships or landing craft ready for the "real" assault in the Caribbean. Missions executed by the battalion included AAA protection of FA battalions, beach defense, and close support of infantry.

Since the return to Fort Benning, the battalion has fired in a close support of infantry role, in a demonstration exercise for the Infantry School, which was a "Battalion in the attack" exercise, and in another Infantry School exercise—an "Engineer River Crossing."

In May, one hundred National Guard officers attended a school at Fort Benning which was conducted by officers and noncommissioned officers of this unit. This course of instruction was for two weeks and covered the latest development in AAA AW (SP) tactics and techniques as well as AW in the ground support role.

The battalion also participated in the making of a training film, which shows AAA AW in close support of infantry and armored divisions. (The Signal Corps reports that this film will not be available for distribution for at least another year.—Ed.)

Since there are no suitable AAA firing ranges available at this post, the unit is scheduled to move to Camp Stewart, Georgia, in June to fire an AAA target practice. One battery is scheduled to remain at Camp Stewart for approximately three months to provide logistic support for National Guard units which will fire on these ranges most of the summer.

The battalion is stationed in the Sand Hill Area of the reservation which is approximately five miles northeast of the Main Post. In this area are the two-story, temporary, wooden barracks, all surrounded by many tall Georgia pines. These quarters and the grounds in general are being continuously improved and are becoming more bright, cheerful and homey each day.

Excellent quarters for married officers and NCO's are available on the Main Post with all quarters being allocated by date of rank. The Battle Park and Camellia Apartments which contain several hundred units have been recently completed and are about one mile from the Main Post. In addition, a new apartment project has been started on the road from the Main Post to Sand Hill and upon completion will accommodate six hundred families.

For recreation, there is a golf course for enlisted men at Sand Hill and a course for officers on the Main Post. Also there are several excellent officers clubs, NCO clubs, service clubs, hobby shops, recreation halls, libraries, movies, and gymnasiums at both the Main Post and Sand Hill Area. In

addition, unit softball and basketball teams have been organized and will compete with other units of the 3d Division.

Fort Benning is about ten miles from Columbus, Georgia, which is a modern progressive city with many stores offering a variety of merchandise to suit any taste, and adequate recreational facilities for Army personnel. There are other large cities near Fort Benning—Birmingham, Alabama; Atlanta, Georgia, and Macon. Also near by are the Gulf of Mexico and the Atlantic coast. All are within short driving distance for those who prefer to go away on week ends in search of entertainment. The 3d Infantry Division maintains a rest camp at St. Augustine, Florida, during the summer, to which quotas are provided for our enlisted men.

Army Officers' Promotion Guide

Contents:—

- **Alphabetical listing of all Regular Army officers**
- **Numerical listing of all 22,483 names**

Informative text on:

- **Officers' Personnel Act 1947**
- **Officers' Retirement Act 1948**
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Authoritative information on the effects of attrition through retirement, promotion, etc., on your future.

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Antiaircraft Journal

Enlisted Courses at the Artillery School

Recognition of the increased reliance which is placed on the individual soldier due to the complexity of modern artillery weapons and techniques is reflected in the program of instruction at The Artillery School.

Training in the specialist courses at The Artillery School is ideally suited to appeal to young and ambitious soldiers of both artillery branches. Theory and practice including work in the classroom, laboratory, and field are carefully balanced to give the soldier a well rounded education in his chosen field.

COMMUNICATION

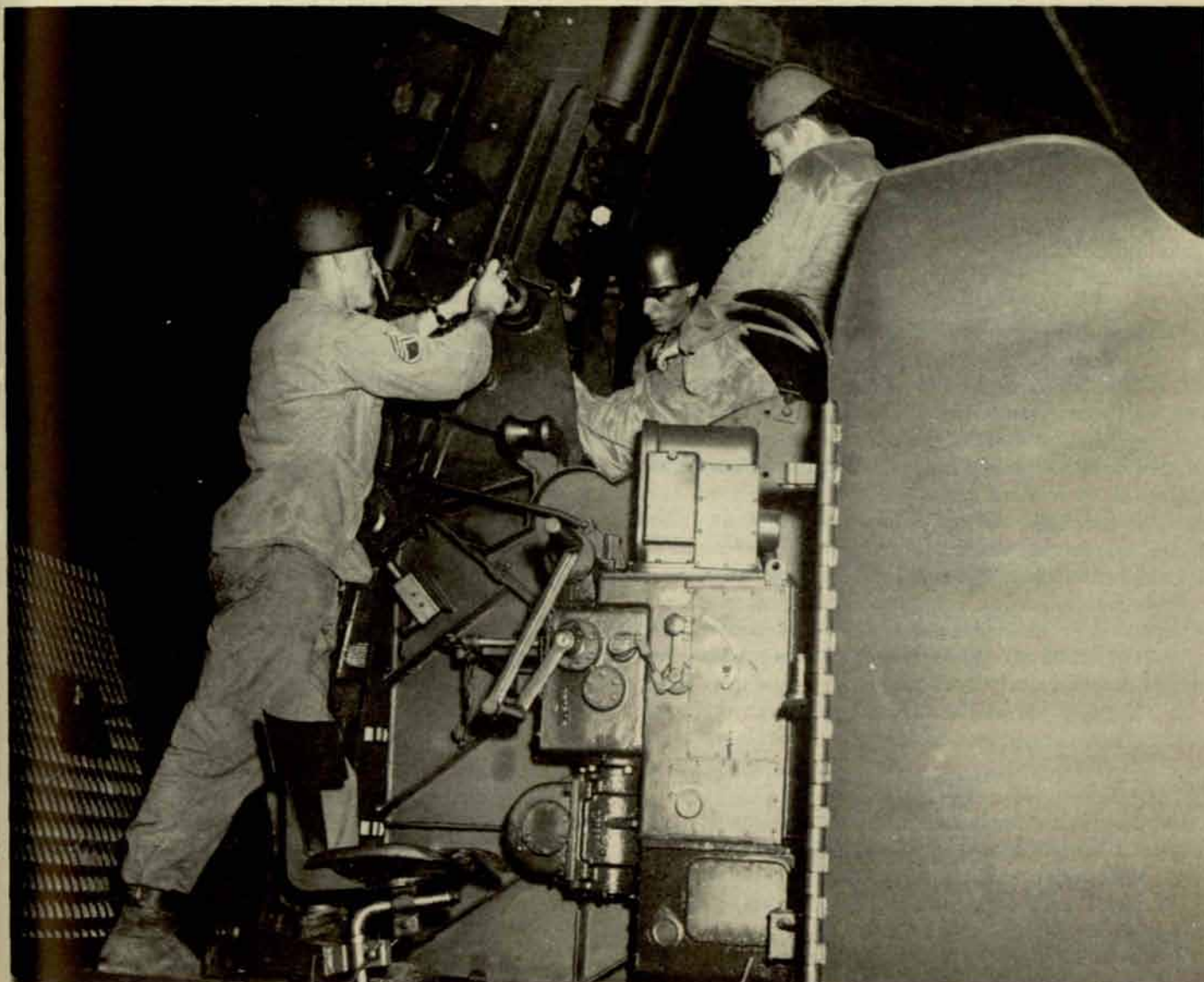
For the young soldier who wants to learn radio, five Radio Repair Courses, each of approximately 21 weeks' duration, are scheduled at The Artillery School. These courses will begin on 12 July, 23 August, 6 December 1950, and 31 January and 23 May 1951.

The knowledge and abilities needed for attendance are not severe nor is the course unduly difficult. The objective

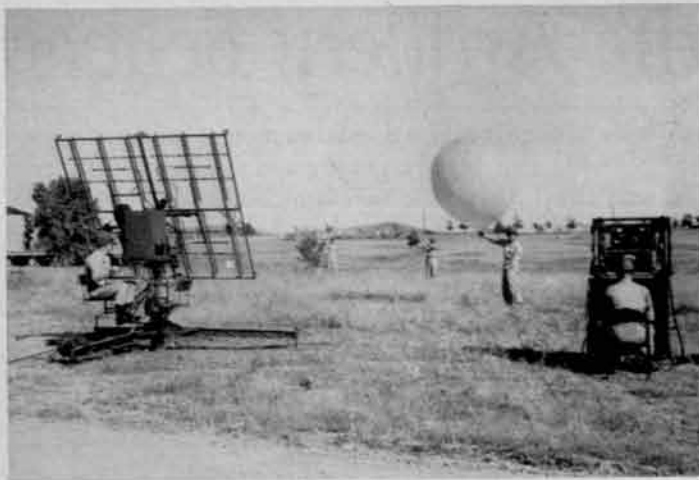
is simply to qualify selected enlisted men as radio repairmen (SSN 0648), capable of repairing and maintaining all radio sets and allied communication equipment used by artillery units. The following brief outline of the entrance qualifications and scope of the course will bear this out.

First, a man must have an Aptitude Area IX Score of 110 or better. Area IX is a test covering basic electricity and radio fundamentals. An AGCT score of 110 may be used in lieu of the aptitude area score. Second, he must have normal color vision in order to be able to trace colored coded circuits in schematic diagrams.

The course is designed to permit the student to progress from basic mathematics and fundamentals of electricity to the more intricate problems of circuit tracing, trouble shooting, and repair. It includes practical shop work beginning with proper use of hand tools and developing into actual repair of radio sets and other communication equipment. Installation, operation, maintenance, test and repair of AM and FM radio equipment, telephones, switchboards and



Antiaircraft Artillery mechanics learn to do by doing.



Meteorology students learn to use modern equipment.

power equipment are thoroughly covered with the emphasis placed on practical application along well-organized lines.

Four Artillery Communication Courses covering both antiaircraft and field artillery are similarly planned, commencing 12 July, 6 September 1950, 10 January, and 14 February 1951.

The requirements for attendance at the course are that the applicant have an Aptitude Area IX Score of 100 or better (or an AGCT score of 100 in lieu of the aptitude area score). In addition he must be a noncommissioned officer with prior experience in a military or civilian occupational specialty directly related to telephone or radio communication. A high school education or equivalent is desirable.

The course covers the entire field of artillery communication and entitles the student to an SSN of 0542 upon graduation. Its purpose is to train enlisted men in the installation, operation and maintenance of artillery communication equipment, and in its tactical employment.

Detailed instruction is given in basic electricity and radio theory. Students are thoroughly grounded in the techniques and procedures employed in operating both with wire and radio equipment. In addition, the organization and tactical employment of artillery units and allied arms are taught as a basis for instruction in the communication systems of all artillery units.

As in the Radio Repair Course, much of the time is devoted to practical work, both in the shop and in the field on actual communication problems and exercises.

Both communication courses are designed to train students for duty in field artillery and antiaircraft artillery units. Graduates are returned to their units with a wide background of knowledge pertaining to their specialty and with a detailed knowledge of the equipment, procedures, and systems of their particular organization.

METEOROLOGY

Another attractive but highly technical course is the Artillery Ballistic Meteorology Course. Because of the new types of matériel and advanced techniques developed in recent years, qualification in this course opens up a practically unlimited field of endeavor for the enlisted man.

While the basic requirements for this course are not quite as high as for some other courses, the applicant must have a good educational background. He must have a score of 100

or more in Aptitude Area II, with some high school work in algebra and geometry. A knowledge of trigonometry, physics, and radio is desirable but not essential.

The four classes, each of 16 weeks' duration, start in August, November, January, and May.

This course covers the entire field of ballistic meteorology. It includes basic meteorology, use of the radiosonde and radiosonde receptor, radio direction finder, and radar.

WEAPONS MAINTENANCE AND REPAIR

Getting away from the "long-hair" subjects, The Department of Matériel conducts two courses that get right down to the business end of the artilleryman's trade—the guns themselves. The first is the Field Artillery Weapons Maintenance and Repair Course of approximately 16 weeks' duration, and the second is the AAA Weapons Maintenance and Repair Course which runs for 19 weeks.

During the first two months these courses are combined to cover a number of common subjects important to both field and antiaircraft artillery mechanics. Common subjects include small arms, explosives, rigging, carpentry, metal work, and a course in leadership and methods of instruction. The class is then divided and each section follows the course applicable to its particular field.

The antiaircraft course covers all antiaircraft weapons from the multiple caliber .50 machine gun up to and including the 120mm antiaircraft gun. The field artillery course thoroughly covers all field artillery weapons from the 75mm pack howitzer up to and including the 8-inch gun.

Applicants for either course should have a score of 105 or higher in Aptitude Area VI and should have a grammar school education or the equivalent. Some previous mechanical experience is desirable, and a natural inclination toward mechanics is of great value to the student.

Today, more than ever before, the artillery demands highly trained specialists. These specialists cannot be mass produced with instruction imparted over a public address system when commanders suddenly realize there is a shortage. The need must be recognized now, and the qualified soldier must be encouraged to prepare himself for the opportunity to serve in a highly critical and important job.

It has been customary for commanders to regard with undisguised suspicion any suggestion that they "send their best men to school"—and formerly their suspicions may have been well grounded. However, present regulations prescribe that all students must be returned to their assigned organization upon completion of their course. There is no hedging on the matter, since home units now include that stipulation in the orders directing the student to attend the course.

Your problem, if you are a unit commander or personnel officer, is not to post a small notice on the bulletin board calling attention to an article in the *ANTIAIRCRAFT ARTILLERY JOURNAL*. The men won't take the trouble to look up the article—even if they do read the bulletin board. Get out and tell them about it personally at retreat or some other unit formation. Better yet, take a look through the Form 20's again, pick out those men you think would qualify and might be interested—and then sell it to them!

Ack-Ack

(Continued from page 14)

One of these was in action at the Burnt Farm position, where Messrs Cossor had an experimental establishment. The set was still actually in the firm's hands, and was the result of an entirely unofficial link-up between Cossor's and ourselves. The set was capable of giving such good results that I felt sure that, if only we could get forth such sets in London and get them to work properly, our efficiency would be so increased as to make the capital a death-trap for the Germans. Of course, by the time we did get them the main attack was over, and later on, when the heavy raiding started again, new enemy aircraft and methods of employment had again temporarily outdistanced our defenses' equipment.

The trouble was that, right at the start, the country had been handicapped by three fundamental misconceptions. The first was that war could be waged successfully without adequate antiaircraft defense; secondly, that antiaircraft defenses could be based on a purely static organization; and, thirdly, that operational control was practically automatic: there was no need for formation commanders to intervene.

The Prime Minister was now taking a very keen interest in our affairs, and, in view of the moderate success we were having against the night raider, I sometimes found it an embarrassing interest. Whenever a new problem of high importance arose Churchill at once took over the chairmanship of the various meetings on the subject and saw to it, as I think he might say himself, that "our affairs progressed." So now he ordered a series of meetings with reference to night air defense (known as N.A.D. meetings). These took place at least twice a week, very often at an hour when most of us would have preferred to be in bed, and always there were some very pertinent questions asked. I could not say that I was at all satisfied with our results. As was proper at these meetings, the Air Force were first of all asked to give their views on the situation, and, looking back on it, I think they made the best of a very bad case.

At that time night fighter defense was deplorably inefficient. The searchlights took their share of the blame, and, I think, perhaps unreasonably, as we were all aware of their difficulties with regard to modern equipment, and beyond that we knew that on only certain nights of the year was the air sufficiently clear for the searchlights to operate much over five or six thousand feet. The gun results were steadily improving, and it was a great pleasure to me to hear on more than one occasion the Prime Minister remark, "I think you are doing better each week." That "better" was still most unsatisfactory, and we were spending a great deal of ammunition for small returns, I was, of course, ordered by Churchill to keep him informed regarding ammunition expenditure, etc.

Every day made it clearer to us that the problem was one of immense difficulty. Our London "barrage" was a policy of despair. Every gun had been told to fire every available round on an approximate bearing and elevation. Morale had been saved, if there had been no other results. But barrage it was not, and, as the results were becoming obviously

disproportionate to the expenditure of ammunition, morale began to sag again and the abusive letters to arrive. There were certainly plenty of them, and during the winter of 1940-41, when between August 23 and New Year's Day there were only eight nights free from raiding, they reached a high level of invective.

Dear Sir,

As a citizen of London, I think the antiaircraft defense of London the biggest scandal since Nero . . . began one tirade.

HEAVY ATTACKS

I attempted to cut down the expenditure in ammunition, and at once Churchill rang me up on two occasions to ask why I wasn't firing more. And when I counted up our expenditure of ammunition at the end of a week I found that, in spite of my efforts, in two months I should have no 4.5 inch barrels, and in four months I should have none for the 3.7's either. In addition, the nights were getting longer, and unless we were to be faced with cutting our fire down to very small proportions, the matter would have to be taken up very urgently indeed. After the summer of the Battle of Britain, here, with vengeance, was the winter of our discontent.

Throughout October and the first part of November the pattern of the attack remained the same. By day, fighter bombers and fighters swept over Southeast England. By night London was persistently attacked, while other towns received periodical visits. On the night of October 15-16, 1940, London had a more intense raid than ever before. Parachute mines were doing a fearful lot of damage. Yet, out of the 235 raiders, we only managed to destroy two, with two more damaged, for an expenditure of 8326 rounds. When I say that this was, up to this time, a record achievement by night, it will be realized just how far we were falling short of what was required of us.

By day the German fighter sweeps had turned their attention from time to time to aerodromes, and further great calls were made for Bofors guns. As these were the most effective weapons for countering the parachute mines, this new demand for light antiaircraft guns was an added embarrassment. Both the Air Ministry and the Admiralty, in making their demands, admitted that they knew that we hadn't got enough to go round and that any that were given them would have to be taken away from other defenses. Heavy antiaircraft guns were in increasing demand, too. On November 4 we were requested to supply extra guns for Coventry, for the Western ports, for Northern Ireland. But we just hadn't got enough guns to go round, and that was all there was to it.

Everything we could think of to improve the night defenses was tried. Very gradually the results, while nothing like good enough, began to improve. During October, 22 enemy aircraft had been shot down at night, 9 of them in the last four nights of the month, and during the beginning of November the weather hampered the raiders more than we did.

Birmingham, Portsmouth, and Southampton each came in for damaging raids. But, very gradually, it seemed as if the results of our efforts were improving. In November we

shot down 41 planes, of which 25 were night raiders.

After the heavy raids on the Midlands, the Ministry of Aircraft Production demanded extra defenses for the aircraft industry; mobile 3.7-inch guns had to be withdrawn from other parts of the country, and 40 3-inch guns had actually to be withdrawn from London to replace them. This left only 192 guns in London, and, at the same time, the Admiralty demanded an increase in the pace at which we were returning to them the 136 3-inch guns that we had borrowed. These were wanted for defending merchant shipping. The siege of Great Britain was being intensified, and in December the raids were, if anything, even heavier than they had been before.

At first the Luftwaffe continued its old tactics of switching the attack from place to place. This, in spite of its uncertainty, had some advantages, because it gave us time to get tidied up again after a raid, restore communications, public services, and so on. Now, however, they started raiding the same provincial target several nights in succession, and the chaos caused was considerable.

Bristol, Portsmouth, Birmingham, Sheffield, and Leeds all came in for raids, but it was Merseyside that, on December 20-21, received the first of the really prolonged provincial attacks. For four nights the attack continued, and, although this may not seem great in comparison with such raids as had been pounding London for 75 nights, the difference in size of the two targets meant that the provincial centers suffered a disproportionately great concentration of damage.

December 29-30 saw a great fire raid upon the City, a spectacular and devastating attack which swallowed up in flames great areas around St. Paul's Cathedral. And so 1940 came to an end. December's results were again a disappointment, with only 14 of the enemy added to the Bird Book, and, although we had destroyed 455 aircraft during the year, we were bitterly disappointed with what had promised so well. Attack was, once again, far in advance of the defense.

All the same, there were one or two compensating figures. We were already shooting almost as well by night as was possible by day during the First World War. This was a tremendous step forward in three months.

The number of rounds per night bird had also been greatly reduced in three months. In September it had been more than 30,000 rounds; in October 11,000; in November 7276; and in December 6948; whereas, for comparison, the average rounds per aircraft for day shooting in 1918 was approximately, 6000. So that, gloomy as we may have been, we had grounds for some small ray of hope that we might eventually solve the problem.

Manpower—this was the new problem which was besetting us and threatening to nullify anything we might do to achieve technical improvements. We were short of men, and the shortage was one both of quantity and quality. I had had several cracks at the Army Council in my attempts to get back those who had been posted away from us to the B.E.F. All the Army Council would say was that the number of officers transferred to us from the Field Army was very largely in excess of the numbers who had been transferred out of the Command. This, of course, quite missed

the point. It was not only a question of numbers: we had posted away trained men and we had received in return untrained men. What was worse, we had been allotted a high percentage of men of very low category, both mental and physical. Professor Bartlett, at the Cambridge Psychological Laboratory, told me that, while the general Army intake might "be regarded as a genuinely unselected group, the AA intake has already, in some way or another, been selected in some negatively useful manner. . . ."

This was a serious matter, for, quite apart from the many specialist duties requiring a high degree of intelligence, AA work in general called for a very fair standard of intelligence as well as considerable powers of endurance.

ENEMY OVER SWANSEA

On the third night of these raids, the shopping center of the town was completely destroyed at a time when the guns were silent. A fierce anger flared up against the AA gunners, and, as was so often the case, it was misinformed. The civilian population of Swansea did not know that this withholding of fire had been made on RAF orders to enable the night fighters to operate. All they thought was that AA had let them down. I should have been more depressed by this if the figures for February had not shown that our number of rounds per unseen bird had fallen by over 1000 to the lowest number they had yet reached. Results were being achieved by the continual elimination of small errors, and our radio-scientists were our biggest asset in this process.

THE BATTLE OF THE FLYING BOMBS

The second Battle of London, the battle against the flying bomb, was as revolutionary in its scope and in its implications as had been those first engagements against the Taubes and Gothas which had led the attack of the heavier-than-air machine. Now we saw beginning the first battle of the robots. Human error was being gradually eliminated from the contest: in future, the machines would fight it out.

The battle lasted for more than nine months, and was fought in three clearly defined phases—from June 13 to September 1, 1944; from September 6, 1944, to January 14, 1945; and from March 3 to March 29, 1945. It was in the early hours of June 13 that I was awakened by an unusual uncertainty on the part of our local air-raid siren. There was an "Alert" followed almost immediately by the "All Clear," which, in turn, was followed almost at once by another "Alert." A few moments later my telephone rang in the darkness, and the Duty Intelligence Officer reported to me that Diver had at last arrived.

Seven flying bombs were plotted in this opening salvo, and one of them, followed by a discreetly observant Junkers 88, flew straight to London, where it crashed onto a railway viaduct at Bethnal Green, blocking all the lines out of Liverpool Street. This was lucky beginning. The public were at first allowed to know nothing about it. They were told that an enemy aircraft had been shot down onto a railway bridge—indeed, it may be that we really did draw blood with the first shot of the new battle, for among the wreckage of the flying bomb was found a fuse of a heavy antiaircraft shell. Three-quarters of an hour later another

thirteen were plotted, and, after them, another two which seemed to have come from the Cherbourg Peninsula.

We were not getting the results we should have done. Here was a target which actually obeyed all the prewar assumptions of antiaircraft gunnery. It flew straight, at a constant speed and unchanging height. It should have been ideal. But our shooting was both wild and inaccurate. Many of the claims to have destroyed flying bombs arose from no more than the fact that the missile had reached the end of its course and regardless of our fire, had dived to earth. At a generous estimate, I should think we were destroying perhaps 13 per cent of the targets.

There was something to be said on our side, however. The bomb, a very small target, flew at a high speed and at a height which was the most difficult of all to deal with: it was just too high for effective light antiaircraft fire and too low for easy engagement by the heavy guns.

As early as February we had made it clear that we could only expect to destroy a very small percentage with our existing equipment. But, we said, if we could only get delivery of the equipment we had asked for from America, we should certainly do a lot better. In particular, we badly wanted the SCR 584, which, as I have said, provided, with the electrical predictor, a robot defense against the robot weapon. They had not yet been delivered, and we had to make do with what we had.

CONTRIBUTION FROM THE UNITED STATES

The U. S. contribution to the Diver defenses, and the interest that the Americans showed in them, had a very real bearing on the ultimate victory over the flying bomb. And it was victory over the flying bomb that we had promised to the Chiefs of Staff.

Now, as American equipment began to arrive in increasing amounts, the promised victory seemed to be in sight. The fact that it was arriving at all was largely due to the fact that I had sent one of my staff, Major Blair, on a flying visit to the United States to put the position more forcibly and more urgently than could be done in the ordinary way. His task was to speed up the delivery of items already promised and to beg for further supplies to be lent to us. In the courier aircraft of U. S. Air Transport Command, which carried him to Washington, there traveled the parts of a complete crashed, but unexploded, flying bomb—just to show the sort of thing we were talking about. Although, on his arrival, there was very little hope that his mission would prove successful, a 35-minute meeting with General Marshall, U. S. Army Chief of Staff, put a very different complexion on things. Largely due to the General's influence, an immediate allocation of 165 SCR 584's, together with all their ancillary equipment, was made, and they were shipped to England on the very next boat.

Furthermore, General Eisenhower took a personal interest in the state of the battle. London, he said, was as much a base for American troops as for British ones. Therefore he would lend 20 American batteries to the defenses. They operated there with their 90mm equipments most effectively. And during the battle on the South Coast they contributed 138 flying bombs to our total score, while they also shared in the destruction of a further 309.

The strain was enormous: troops had to be at constant readiness, each site needed several spotters, training had to be carried out when there was no action going on, equipment was being moved in and out, sites moved and built and rebuilt. Sleep was difficult until the troops got used to the fearful noise that went on with bombs crashing and guns firing. The enemy's activity was continuous. From June 27 to July 2, out of 120 hours, the guns were manned for 108 hours 12 minutes. On one of these days they were manned for the full 24 hours, and on another for 23 hours 20 minutes. Under these conditions it is not surprising that the troops were gradually becoming exhausted, training was perforce neglected, and the shooting began to show signs of wildness and inaccuracy. Reinforcements had to be brought in from other parts of the country to allow for periods of rest.

In the first week of the new deployment along the coast the guns shot down 17 per cent of all targets entering the gun-belt. In the second week this figure rose to 24 per cent, in the third week it was 27 per cent, in the fourth 40 per cent, and in the fifth week 55 per cent.

By August 23 the percentage of kills had risen in a week from 55 to 60 per cent, and in the last week of this first phase of the battle it rose again to 74 per cent of all the targets presented to the guns. On one night during the triumphal week the total actually reached 82 per cent.

There was indeed cause for satisfaction. We had destroyed more than 1550 flying bombs with our guns—68 of them on one memorable day when, of the 96 missiles launched by the enemy, only 4 reached the Greater London area.

The newspapers, the newsreels, and the letters that poured in to us, all were full of praise.

HEALTHY CRITICISM BRINGS US BACK TO EARTH

Only a short while before, people had been anything but complimentary. The questions that had been asked in Parliament about our ability to cope with the flying bombs had been one of the public examples of irritation at not being able to see results achieved. Private letters I received were much ruder.

As an old gunner (R. H. and R. F. A. first commission Nov. 1895) I wish to put forward some suggestions (wrote an old warrior from Battle). I am Head Warden . . . and therefore know only too well what is actually happening and what the civilian population is thinking and saying about it. They are as disgusted as I am with the shooting of the antiaircraft guns . . . No one in their right minds would choose a rifle to shoot driven partridges . . .

V2 FOLLOWS V1

There were other enemy threats, and by far the most difficult problem we ever had to tackle was to find some means of defense against the V2 rocket. Here we had a target that was travelling at over 3,500 miles an hour, or about five times the speed of sound. It was no use puncturing it if we did not detonate the warhead. It had to be blown up in the air, and the warhead was not only protected by a casing of quarter-inch steel, but was also a very small target—a

fraction of the whole rocket. It made all our equipment and our methods look far more antiquated than they had done against the 200 m.p.h bomber in the primitive days of 1940. Our chances of dealing with it might be small, our hope a forlorn one. But it was our only hope, and unless we made a start and gained some sort of operational experience against this new form of warfare, we were never likely to improve.

The majority of people—even the more enlightened ones—thought that it was an impossible problem for us to solve: we found ourselves up against all the opposition to experiment that we had been fighting for more than four years. Fighter Command, when we put the matter up to them, were not exactly encouraging in their attitude. But we were determined to have a crack at finding the answer, our labors would help in the development of counter measures in the future. It was some measure of the seriousness of the situation that Fighter Command agreed that if I could produce scientific data to support an outside chance of 100-1 against hitting any rocket my proposals might go forward to higher authority.

In December 1944 we formed a small party with some scientists whose job it was to get going some scheme to blow up the rockets in the air. Within an incredibly short time they produced a scheme—purely a theoretical one—which entailed the use of special radar stations and a special method of prediction. We decided to give this scheme a trial, and a number of radar sets were specially modified and deployed on the East Coast. At first the scheme looked fairly promising, but soon we realized that we were up against very great radar difficulties. The sets were designed to detect aircraft flying at heights up to 30,000 yards. We were now trying to detect rockets (which were, anyhow, much more difficult than aircraft) at heights of more than 300,000 feet and at ranges up to 140,000 yards. It was too much to expect that the special radar sets would work entirely efficiently the first time out. Nor did they. During December 1944 and January 1945 we had to modify the equipment a great number of times.

While we were doing this we discovered a number of interesting things not concerned with rockets. We found, for instance, that the radar sets could detect meteorites: these meteorites were, in fact, somewhat of a nuisance, for they looked to the operators much like rockets. We even found that the Milky Way caused trouble to the sets, and, after the end of the war in Europe, we actually used these sets, both to watch meteorites and to measure the effect of an eclipse of the sun.

In January it became apparent that our original scheme required very considerable modification before we could reasonably hope for it to be successful. The party went back into session and got to work again. Early in February a new scheme was thought out and was given a trial: immediately the prospects of success began to look bright. Throughout February improvements to the scheme were introduced, and by the middle of March we were confident

that we were within measurable distance of some considerable success.

Even now I may not give details of our scheme, but obviously it entailed predicting the point of fall of the rockets and firing the London guns to burst their shells in their path. It worked in such a way that we had only two seconds in which to make our prediction, for the guns had to be fired when the rocket was still more than thirty miles from London. In order to get these plans working we had, first, to make more than 25,000 complicated mathematical calculations.

Towards the end of March we wanted to have a crack at the rockets. A special panel of independent scientists was summoned to examine our scheme, and they reported favorably on the prospects of success. We planned to bring a number of extra guns into London, and it was variously estimated that we should blow up in the air between 3 and 10 per cent of all the V2's we fired at. However, Monty beat us to it, and, before we could wring permission out of the War Cabinet to try our plan, the rocket area of Holland was cut off by the liberation armies and V2 attacks ceased.

There were very many people who thought that it would be a mistake to fire at V2's. They thought that there was little chance of success, that the firing of the guns would disturb the people of London, and that there was a danger of people being hit by shell fragments. I never took that view. I believe the majority of people loved hearing the guns, and thought of them as their own particular guns. I believe that if we had been successful (as I am sure we should have been) in blowing up 10 per cent of the rockets, the people of London would have gladly accepted the disturbance and the very slight danger of being hit by shell fragments. More particularly as an initial 10 per cent would rapidly improve as we got experience, and we might hope for a very substantial percentage eventually.

PRO AND CON

I will end by quoting two letters. The first was received during the flying bomb battle as we were moving to the coast:

Dear Sir,

Your efforts during the night blitz were not a great success, and now the flying bombs get through as they like. Isn't it time you went?

And the second, addressed somewhat unusually to Sir General Pile, was received just as the first phase of the flying bomb battle had been won:

Dear Sir,

Thank you and the boys for all your work.

From

AN EAST-END MOTHER.

Somehow I think that that letter is better value than a lot of medals.



Captain Jones, What Is Your Primary Armament?

By Captain Kenneth H. Hendron, CAC

Captain Jones, what is your primary armament?

Is it a 90mm gun, a tank, an airplane, or a rifle? No sir, you're wrong!

Your primary armament is the genuine GI, Model 1950.

When you assumed command of your battery, you signed for so much property. You thereby signified that you were responsible for the maintenance and operating condition of the equipment charged to you, and if you are supply conscious you spent a great deal of time seeing that this equipment was present and in operating condition. But at the same time that you assumed command, you assumed responsibility for the clothing, housing, feeding, mental and physical well being of from 100-200 men. How much time have you devoted to fulfilling that responsibility? Do you know that Sergeant Bull lost a child last month and is mentally and emotionally upset? Do you know that Corporal Roe, although a graduate of a radar school, is assigned to the machine-gun section and is most unhappy with his assignment? Do you know that Private Doe would like to take some USAFI courses, but nobody has taken the time to explain the procedure?

Well, Captain, I would like to suggest a method for establishing closer relations between your men and yourself which undoubtedly will prove advantageous to both parties.

I suggest that you interview each man in your battery, personally and in private. Make the man feel at this interview, that you are glad to know him, and that you know he is, or will be a credit to the battery.

The first interview should cover present assignment; any desired change in assignment; military and civilian education; military schools or correspondence courses desired; religious preference; hobbies; sports; family background to include the names of wife, children, and parents; and health and financial condition of dependents. If there have been any disciplinary problems in the past, attempt to ascertain the basic causes at this interview. Emphasize the fact that you, as his military supervisor, are vitally interested in him and his problems, and that you are available for counsel and guidance twenty-four hours a day, seven days a week.

After the interview, a card should be written to parents or wife indicating that you have talked with their son or

husband and that you are proud to have him in your battery. Do not let this first interview be the last. Speak to your men frequently at work, after duty hours, and at mess. Let them know you are interested in their progress and their families. Believe it or not, if they have any complaints, they'll come out at these informal conversations. If a baby is born to the wife of a member of your command, be among the first to congratulate the soldier. If he, or any member of his family is sick or injured, call on them if possible.

Throughout your contacts keep the soldier impressed with the purpose and objectives of the unit and the requirement for team work and self reliance on his part.

OUR BOOK

DEPARTMENT

— :: —

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News and Comment

The Journal Changes Editors

As this issue goes to press Colonel Charles S. Harris replaces Colonel W. I. Brady as Editor of the JOURNAL.

Colonel Harris comes to the JOURNAL with a broad experience in antiaircraft artillery. He entered the service as a second lieutenant in World War I. Between the wars he served with such noted AAA regiments as the 60th on Corregidor, the 63d in California, the 61st in Illinois, the 64th in Hawaii, and the 69th in Texas. He also served as an antiaircraft instructor in the Coast Artillery School, as a member of the Coast Artillery Board, and as Antiaircraft Officer with the Third Army.

At the outbreak of the last war he was serving as the Antiaircraft Officer with GHQ in Washington. In 1942 he was appointed a Brigadier General and assigned to the 42d AAA Brigade, with which he participated in the Aleutian Campaign. In 1945 he commanded the Tenth Army AAA through the Okinawan Campaign.

Colonel Bailey's article recommended for those who are skeptical about the future of AAA.

TO THE EDITORS:

The writer is grateful to Colonel Donald J. Bailey and the JOURNAL for the best article ever published in connection with the future of AAA. Colonel Bailey's "Our Antiaircraft Artillery Has A Bright Future" (March-April issue, 1950), certainly points up the questions that lie in back of nearly everyone's mind and comes up with some lucid, straightforward answers for all of us whose thoughts turn to the future and the part our specialized training will play in the National Military Establishment.

Clearly, Colonel Bailey is justified in his optimistic outlook for the future and the "juniors," now entering upon a new career, have an opportunity within their grasp which has seldom been equalled in the military profession.

COLONEL-USAR.

We Stand Corrected!

To the Editor:

I enjoy each and every issue of the ANTIAIRCRAFT JOURNAL from cover to cover, finding it an excellent source of timely technical and tactical AAA information.

It is in the constructive critical light that I make reference to the March-April issue article by Lt. Col. Orman. Colonel Orman says that Figure 1, page 45, is an interior view of the SCR 584. With this statement I do not agree. The unit in the right foreground is the RC 184 (IFF Interrogator—responder). The balance of the equipment shown is not known to this reader. However, it is obvious that it is not the SCR 584, nor is it mounted in the trailer K-78 which

houses the SCR 584. This last statement is based on the apparent curvature of the trailer roof, suggesting that the equipment is probably housed in a trailer of the M-14 variety.

Respectfully,

GALE V. BULLOCK

Capt., CAC, Res.

Radar Instructor

AA & GM Branch, TAS

August 1945 through September 1949

Captain Bullock is correct. The statement should read, "The unit shown is the RC 184 (IFF Interrogator—responder) which is used with the SCR 584."—Ed.

The Armed Forces Hostess Association

The Armed Forces Hostess Association is an organization, started in Washington just a year ago by a small group of officers' wives. It now boasts of 600 Assistant Hostesses who stand ready to put "Operation Neighborliness" into action.

"Operation Neighborliness" means that when a Service wife comes to Washington and begins settling her home, an Assistant Hostess in her neighborhood calls on her, welcomes her, and tries to help her over the first difficult days. She answers the many questions which worry a newcomer. She has information about baby sitters, schools, bus routes, nurses, shopping centers, and even summer camps. For detailed information about any one of these, the Assistant Hostess may have to call the Hostess office.

The Association has established headquarters in the Pentagon, where voluntary hostesses maintain a desk from nine to four o'clock, Monday through Friday, in Room 3A-486. Their telephone number is Republic 6700, extension 73180.

The need for more assistant hostesses is still great—Army, Navy, Air Force. The Washington district is so vast, and service people so numerous, wives are urged to join this fine work. The work of a hostess requires very little time, less effort, and no expense whatever, except a neighborly spirit.

This Association has become the "mother" of others inspired by it. Already service wives in New York and overseas have begun organizing similar groups, that new families everywhere may quickly feel at home.

"Sniperscope" For Infantrymen

The electronic "sniperscope," night eyes of the infantry credited with causing 30 per cent of all enemy casualties in the Okinawa campaign, is to become a standard item of Army equipment.

The Army announces that field forces were so impressed with the efficacy of the auxiliary weapon, enabling the rifleman to "see" the enemy through darkness, that all units of 10 divisions will be equipped with the device.

At night the rifleman points the "sniperscope" and his gun sights toward a spot whence a sound has come. By switching on an infrared spotlight, he makes the rays scan the area. These are reflected from the target, picked up by the telescope and transferred into an image across the sight of the rifle.

Chemical Warfare May Subdue Enemy

The U.S. is capable of using a warfare method that will destroy an enemy's will to resist without wrecking his national economy, Maj. Gen. Anthony C. McAuliffe, Army Chemical Corps Chief indicated in a recent speech.

"We in the Chemical Corps believe that the weapons developed or now being developed by the U.S. provide an opportunity at the smallest logistical cost to reduce a potential enemy's will to resist and thereby obtain victory without enormous destruction to the economy," General McAuliffe said.

General McAuliffe, World War II hero, said American preparation for gas warfare deterred the enemy from using it in the war.

He urged exhaustive study of the unconventional fields of warfare, biological, radiological, and chemical as defense measures. He said the U.S. would never take the lead in using such weapons, but would employ them in retaliation if attacked.

Chicago Reunion for "Victory" Division

The 24th Infantry (Victory) Division Veterans' Association will hold its reunion in Chicago on August 11, 12, 13 at the Hotel Morrison.

Ramjet May Power Family Plane

Inexpensive ramjet engines may become the "missing link," which could put the helicopter within the financial reach of the average American family, by cutting down helicopter cost to within price range of the automobile, according to Igor B. Bensen, General Electric Company engineer. In a speech before Sixth Annual Forum of the American Helicopter Society and the Institute of Aeronautical Sciences on March 30, he said that helicopter manufacturing costs tumble when ramjet power is used.—*Air Force*.

National Guard Warrant Officer Procurement and Promotion Authorized

Termination of a "freeze" on promotion of warrant officers and the expansion of junior grade warrant officer procurement in the Army National Guard are provided for in new policies authorized by the Department of the Army.

Major General Kenneth F. Cramer, Chief of the National Guard Bureau, said that appointment and promotion of National Guard warrant officers will be made within the four grades established under the Career Compensation Act of 1949. New provisions for the appointment of warrant officers, junior grade, in the initial pay grade (W-1) will expand the field for such appointments among veterans and members of the National Guard, he said.

Initial appointment is now open to applicants who have served at least six months as officer, warrant officer, or non-commissioned officer in the Armed Forces, including the postwar National Guard, since December 7, 1941, and who achieve a minimum of 10 points under a composite index table. The table provides point credits for graduation from high school or equivalent education, attendance at college or service schools, previous military service, or successful

completion of certain Army extension courses, and for civilian professional or technical skills.

A percentage distribution of Army Guard warrant officers has been set up in each pay grade based on the total number of federally recognized warrants within each State, with percentages generally similar to those of the Regular Army.

Recent modification of tables of organization more than doubled the total allotment of warrant officers authorized the Army Guard, from 3,284 to 7,471.

Bliss Housing Area Named For General Moore

The area containing the recently completed 54-unit permanent housing project on the southeastern portion of Fort Bliss has been named "George Moore Park" in honor of the late Major General George F. Moore, hero of Corregidor, it was announced by Fort Bliss officials.

Two New Classes of Submarines Under Construction By Navy

The Navy, which accepted its first 53-foot "submersible torpedo boat" fifty years ago is continuing its postwar submarine development program with the construction of two new classes of undersea fighters.

One is a new Fast Attack Class of submarines which will have greater submerged speed than present fleet type submarines and will carry the latest electronic detection equipment. The other is an antisubmarine class of undersea fighters that will be smaller than any submarines built since the World War I types.

A total of six Fast Attack submarines, and three antisubmarine submarines are being built. First vessels of each class are expected to be completed in 1951.

Submarines of the Fast Attack Class will be shorter than the current 311-foot fleet type, but will have about the same displacement, 1,500 tons. They will have entirely streamlined superstructures, and will be snorkel equipped.

The three antisubmarine submarines have been designated the SSK-1, SSK-2, and SSK-3. As a result of their small size—they will be 195 feet long and will displace 750 tons—the SSK's will be adaptable to mass production. They will carry advanced sonar and electronic detection equipment.

Enlisted Army Reservists Offered Special 15-Day Basic Course

Army Organized Reserve Corps enlisted men without prior military training will be offered a special 15-day basic course at ORC Recruit Training Camps, under a program which will be put into effect after June 1, it was announced by General Mark W. Clark, Chief of Army Field Forces. Camps will be established in each of the Army areas and conducted under the jurisdiction of the Army commanders.

The program is designed for newly enlisted Army reservists without prior training who are unable to attend the regular 12-week basic training course conducted by Regular Army training divisions.

In the two-week period the Army will seek to produce by intensive, integrated, and progressive effort, a partially trained soldier who can live with, work with, and under-

stand his fellow soldiers; observe the fundamental rules of military courtesy and discipline; practice organization and teamwork; care for his clothing and equipment; handle and fire his rifle with reasonable effectiveness against field targets and employ elementary military tactics and techniques.

After the close of World War II, the Organized Reserve Corps, in its first stages of redevelopment, had no organized form of continuous basic training for its enlisted personnel. Except for the two-hour weekly drill assembly, the regular summer encampment furnished the only opportunity for basic training—along with specialized unit training.

Two years ago, the Army designed its first postwar basic training program for untrained ORC enlisted personnel. The course called for 14 weeks of intensive field training, similar to that given Regular Army basic trainees in active training divisions. Last year this program was reduced to 12 weeks.

It was recognized, however, that some provision should be made for the prospective enlistee who could not conveniently attend the 12-week training course. Therefore the Army developed its new 15-day course.

This shortened course will be given in the late spring and summer months, thereby affording opportunity for the new enlisted reservist to attain his basic training during the vacation season.

Under the new program, after enlistment and assignment to an ORC unit, a recruit will be given a 12-hour prebasic orientation course. This course will be taught by ORC personnel and will include a general orientation to give the recruit an understanding of the interrelation of all basic training and objectives of basic subjects.

As soon as practicable after completion of the 12-hour orientation and preferably within the first year of enlistment, the recruit will be given an opportunity to attend the 15-day Recruit Training Camp. Recruits will be given instruction in basic Army subjects, providing a picture of responsibilities and duties in a civilian component of the Regular Army as a partially trained soldier.

The ORC Recruit Basic Training Camps are intended to provide the necessary basic training that recruits would normally be unable to attain in unit training. The required

training will be covered in far shorter time than has ever been attempted by the Army either with wartime trainees or Regular Army trainees. It was emphasized by General Clark that the objective of this new program will produce only a partially trained soldier. The Army fully recognizes that it is impossible to provide complete and adequate basic training in a two-week period.

Upon satisfactory completion of the 15-day active duty basic training, the reservist will return to his ORC unit and will enter the armory training cycle of that unit.

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National Guard AAA Units Federally Recognized

The following National Guard AAA units have received Federal recognition since the last issue of the JOURNAL:

California:

Battery C, 718th AAA Gun Battalion, San Francisco
Battery D, 718th AAA Gun Battalion, San Francisco
Battery B, 728th AAA Gun Battalion, San Francisco
Battery D, 728th AAA Gun Battalion, San Francisco

Illinois:

Battery C, 768th AAA Gun Battalion, Chicago

Massachusetts:

Battery C, 772d AAA AW Battalion, Chelsea
Battery D, 772d AAA AW Battalion, Fort Banks

Michigan:

Battery A, 300th AAA Gun Battalion, Manister

New Mexico:

Medical Detachment, 120th AAA Gun Battalion,
Lordsburg
Medical Detachment, 697th AAA AW Battalion,
Artesia

New York:

Battery D, 771st AAA Gun Battalion, Brooklyn

Ohio:

Medical Detachment, 182d AAA Gun Battalion, Dayton



Only a fool throws his pistol out the window when there is a burglar in the house.—HON. DAN H. KIMBALL, *Under Secretary of the Navy*.

COAST ARTILLERY ORDERS

DA and AF Special Orders Covering March 1 through April 30, 1950. Promotions and Demotions not included.

COLONELS

Carroll, J. B., to 68th AAA Gp, Ft Ord, Calif.
Harris, Charles S., to Editor ANTI-AIRCRAFT JOURNAL, Wash, DC.
Hopkins, A., to Second Army 2477th ASU, ROTC, Univ of Del, Newark, Del.
McCarthy, E. B., to First Army 1170th ASU, Ft Devens, Mass.
Murphy, J. G., to Hq Second Army, Ft Meade, Md.
Shumate, J. P., to First Army 1129th ASU, NH Mil Dist, Manchester, NH.
Wolfe, W. J., to Continental US Defense Planning Gp, Wash, DC.

LIEUTENANT COLONELS

Barry, R. B., Jr., to Stu Det CGSC, Ft Leavenworth, Kans.
Bigelow, A. E., to USA Gp American Mission for Aid to Turkey, Ankara.
Boyce, W. C., to AA and GM Br Arty Sch, Ft Bliss, Tex.
Bradley, C. U., Jr., to 7689th Hq Gp USEA, Salzburg, Austria.
Burrows, J. E., to 31st AAA Brig, Ft Lewis, Wash.
Caluya, P. Q., to Hq Sixth Army, San Francisco, Calif.
Chirico, C. F., to Stu Det Arty Sch, Ft Sill, Okla.
Cibotti, P. R., Jr., to 35th AAA Brig, Ft Meade, Md.
Dixon, F. R., to ASA Sch, Carlisle Bks, Pa.
Fubank, P. H., to Stu Det CGSC, Ft Leavenworth, Kans.
Hanson, C. C., to Stu Det CGSC, Ft Leavenworth, Kans.
Hempstead, E. B., to Second Army 2517th ASU Office of the Sr Instr for Del, Wilmington, Del.
Hiddleston, E. W., to Hq and Hq Co 7th Engr Brig, Wash, DC.
Holterman, G. H., to Stu Det CGSC, Ft Leavenworth, Kans.
Jeffries, J. C., Jr., to Stu Det CGSC, Ft Leavenworth, Kans.
Kallman, M. M., to Stu Det CGSC, Ft Leavenworth, Kans.
Knapp, E. C., to Hq First Army, Governors Island, NY.
Kramer, A., to Stu Det Hq Second Army, Univ of Pa, Phila, Pa.
Longanecker, C. R., to Hq Fourth Army, Ft Sam Houston, Tex.
Newcomer, F. K., Jr., to OC of S, Wash, DC.
Peirce, G. F., to 88th Abn AA Bn, Cp Campbell, Ky.
Piram, J. S., to Hq and Hq Co 7th Engr Brig, Eniwetok, Marshall Island.
Smith, H. N., to 9th Inf Div, Ft Dix, NJ.
Stewart, J. C., to Armed Forces Info Sch, Carlisle Bks, Pa.
Tall, W. H., to OC of S, Wash, DC.
Witt, L. A., to Stu Det CGSC, Ft Leavenworth, Kans.

MAJORS

Aber, J. E., to Stu Det Arty Sch, Ft Sill, Okla.
Abston, A. A., to Stu Det Arty Sch, Ft Sill, Okla.
Banks, C. M., to Stu Det ASA Sch, Carlisle Bks, Pa.
Birch, W. H., to Stu Det CGSC, Ft Leavenworth, Kans.
Blue, D. L., to AA and GM Br Arty Sch, Ft Bliss, Tex.
Casey, C. W., to AFF Bd No 4, Ft Bliss, Tex.
Castle, E., to Stu Det Arty Sch, Ft Sill, Okla.
Charbonneau, C. K., to USMA, West Point, NY.

Corley, W. E., to 31st AAA Brig, Ft Lewis, Wash.
Corso, P. J., to Ryukyus Comd, Okinawa.
Courtney, R. H., to Second Army 2502d ASU Pa NG Instr Det, Lancaster, Pa.
Crumpton, S. E., to Stu Det Arty Sch, Ft Sill, Okla.
Cunningham, H. A., to Stu Det Arty Sch, Ft Sill, Okla.
Curtis, E. P., to Stu Det Arty Sch, Ft Sill, Okla.
Daniel, R. E., to 31st AAA Brig, Ft Lewis, Wash.
Davenport, C. M., Jr., to Stu Det Arty Sch, Ft Sill, Okla.
Davidoff, J. E., to Stu Det CGSC, Ft Leavenworth, Kans.
Edmunds, J. M., to AA and GM Br Arty Sch, Ft Bliss, Tex.
Evans, B. S., Jr., to Stu Det Arty Sch, Ft Sill, Okla.
Farr, R., to 35th AAA Brig, Ft Meade, Md.
Floryan, T. P., to Stu Det CGSC, Ft Leavenworth, Kans.
George, C. D., Jr., to Stu Det CGSC, Ft Leavenworth, Kans.
Grant, A. R., to Stu Det Arty Sch, Ft Sill, Okla.
Higgins, H. D., to Stu Det Arty Sch, Ft Sill, Okla.
Heim, H. V., to 4052d ASU AA and GM Cen, Ft Bliss, Tex.
Hennessy, J. T., to Stu Det Arty Sch, Ft Sill, Okla.
Isenson, R. S., to Stu Det Hq Second Army, Univ of Pa, Phila, Pa.
Iulicci, T. P., to 88th Abn AA Bn, Cp Campbell, Ky.
Jeffries, C. C., to Stu Det CGSC, Ft Leavenworth, Kans.
Jordan, L. F., to Stu Det Arty Sch, Ft Sill, Okla.
Kean, M. P., Jr., to 35th AAA Brig, Ft Meade, Md.
Laing, J. A., to Stu Det Arty Sch, Ft Sill, Okla.
Lamee, W. S., 3d, to Stu Det ASA Sch, Carlisle Bks, Pa.
Lavell, R. G., to AA and GM Br Arty Sch, Ft Bliss, Tex.
Lesneski, S. V., to AA and GM Br Arty Sch, Ft Bliss, Tex.
Lonsinger, R. W., to Stu Det Arty Sch, Ft Sill, Okla.
McElroy, J. E., to AFF Bd No 4, Ft Bliss, Tex.
McFadden, D. B., Jr., to AA and GM Br Arty Sch, Ft Bliss, Tex.
McGrath, B. B., to 31st AAA Brig, Ft Lewis, Wash.
Maldonado, J. C., to 82d AAA AW Bn, Ft Lewis, Wash.
Manguso, A. H., to Joint Long Range Pt Gr Banana River NAS Sta, Cocoa, Fla.
Mancuso, S. J., to Stu Det Hq Second Army, Univ of Pa, Phila, Pa.
Marshall, J. E., to 4052d ASU AAA and GM Cen, Ft Bliss, Tex.
Martino, P. T., to First Army 1243d ASU, NJ ORC Instr Gp, East Orange, NJ.
Miner, R. E., to 4052d ASU AAA and GM Cen, Ft Bliss, Tex.
Mitchell, A. W., to AFSWP Sandia Base, Albuquerque, N Mex.
Moomaw, O. A., to Stu Det Arty Sch, Ft Sill, Okla.
Moore, J. M., to Stu Det Arty Sch, Ft Sill, Okla.
Myers, G. E., to Stu Det Hq Fifth Army, Univ of Wisc, Madison, Wisc.
Nelson, K. R., to Stu Det Arty Sch, Ft Sill, Okla.
Parker, J. C., to Stu Det Arty Sch, Ft Sill, Okla.
Pell, K. E., to AA and GM Br Arty Sch, Ft Bliss, Tex.

Petrilli, F. J., to Stu Det CGSC, Ft Leavenworth, Kans.
Philbrick, K. R., to AA and GM Br Arty Sch, Ft Bliss, Tex.
Pigue, P. E., to Stu Det CGSC, Ft Leavenworth, Kans.
Pringle, H. E., to Fourth Army 4302d ASU La NG Instr Gp, New Orleans, La.
Pryor, F. D., Jr., to Stu Det CGSC, Ft Leavenworth, Kans.
Quist, F. F., to Stu Det CGSC, Ft Leavenworth, Kans.
Rae, D. O., to Far East Comd, Yokohama, Japan.
Rettgers, F. I., to Stu Det Arty Sch, Ft Sill, Okla.
Richards, A. P., to Stu Det Hq Second Army, Univ of Pa, Phila, Pa.
Ringgold, C. L., to Second Army 2502d ASU Pa NG Instr Det, Pittsburgh, Pa.
Rohan, T. C., to Hq Third Army, Ft McPherson, Ga.
Rouse, E. B., to Hq Sixth Army, San Francisco, Calif.
Saunders, W. W., to Dept of the Navy Comd Amphibious Force, US Pacific Fleet, San Diego, Calif.
Stewart, C. W., to 3d AAA AW Bn, Ft Benning, Ga.
Tarver, T. H., to Stu Det Arty Sch, Ft Sill, Okla.
Walker, B. H., to Fifth Army 5206th ASU Office of Sr Army Instr, Minn NG, Duluth, Minn.
Walker, N. M., to First Army 1129th ASU NH NG Instr Gp, Berlin, NH.
Walker, R. M., to 22d AAA Gp, Ft Custer, Mich.
Ward, W. D., to AA and GM Br Arty Sch, Ft Bliss, Tex.
Watson, W. W., to AA and GM Br Arty Sch, Ft Bliss, Tex.
Williams, D. B., to Stu Det CGSC, Ft Leavenworth, Kans.
Yates, E. E., to AA and GM Br Arty Sch, Ft Bliss, Tex.

CAPTAINS

Abel, C. R., to AFSWP, Sandia Base, Albuquerque, N Mex.
Back, J. F., to 109th CIC Det, Second Army, Ft Meade, Md.
Benson, C. E., to Stu Det Arty Sch, Ft Sill, Okla.
Biery, J. H., to First Army 1202d ASU Albany Rct Main Sta of Det No 1, Albany, NY.
Black, D. W., to AA and GM Br Arty Sch, Ft Bliss, Tex.
Bly, S. R., to 450th AAA AW Bn, Ft Ord, Calif.
Boardman, D. H., to 88th Abn AA Bn, Cp Campbell, Ky.
Bond, J. B., to Stu Det Arty Sch, Ft Sill, Okla.
Boring, J. S., to Far East Comd, Yokohama, Japan.
Bright, C. W., to Stu Det Arty Sch, Ft Sill, Okla.
Buchanan, S. C., to 62d AAA AW Bn, Cp Hood, Tex.
Buck, C. A., to AA and GM Br Arty Sch, Ft Bliss, Tex.
Burger, L. J., to 9th Inf Div, Ft Dix, NJ.
Burgess, J. G., to Stu Det Army Lang Sch, Monterey, Calif.
Butler, J. F., to 9th Inf Div, Ft Dix, NJ.
Cabell, DeR. C., to Stu Det Arty Sch, Ft Sill, Okla.
Cancellare, A. D., to 9th Inf Div, Ft Dix, NJ.
Cargill, W., to First Army 1243d ASU NJ ORC Instr Gp, Hackensack, NJ.
Carson, T. M., to 31st AAA Brig, Ft Lewis, Wash.
Casey, E. L., to 82d AAA AW Bn, Ft Lewis, Wash.
Chilton, C. E., to 9th Inf Div, Ft Dix, NJ.

- Clarkson, R. L., to Stu Det Arty Sch, Ft Sill, Okla.
- Coonly, W. J., to Stu Det Arty Sch, Ft Sill, Okla.
- Cox, R. F., to 35th AAA Brig, Ft Meade, Md.
- Davis, P. W., to Fourth Army 4304th ASU Okla NG Instr Gp, Ada, Okla.
- Deadwyler, W. H., Jr., to Stu Det Arty Sch, Ft Sill, Okla.
- DeFranco, T. J., to Stu Det Arty Sch, Ft Sill, Okla.
- Dickson, L. R., to Stu Det Arty Sch, Ft Sill, Okla.
- Dworak, J. L., to Second Army 2502d ASU Pa NG Instr Det, Easton, Pa.
- Eichler, T. O., to Armed Forces Info Sch, Carlisle Bks, Pa.
- Erdman, G. W., to AA and GM Br Arty Sch, Ft Bliss, Tex.
- Farne, G. H., to Stu Det Arty Sch, Ft Sill, Okla.
- Felter, J. H., to Stu Det Arty Sch, Ft Sill, Okla.
- Fulmer, R. P., to 31st AAA Brig, Ft Lewis, Wash.
- Gaborsky, G. V., to First Army 1170th ASU, Ft Devens, Mass.
- Garnhart, G. H., to AA and GM Br Arty Sch, Ft Bliss, Tex.
- Gillespie, B. S., to Stu Det Arty Sch, Ft Sill, Okla.
- Gray, A. P., Jr., to AA and GM Br Arty Sch, Ft Bliss, Tex.
- Hawthorne, F., Jr., to Stu Det Arty Sch, Ft Sill, Okla.
- Healy, J. D., Jr., to Stu Det Arty Sch, Ft Sill, Okla.
- Heaton, G. P., to Third Army 3441st ASU, Cp Gordon, Ga.
- Herold, J. W., to Army Gen Sch, Ft Riley, Kans.
- Hinman, J. M., to USMA, West Point, NY.
- Hoddinott, G. R., to Stu Det Arty Sch, Ft Sill, Okla.
- Igersheimer, M. I., to Stu Det Arty Sch, Ft Sill, Okla.
- Jemmott, A. H., Jr., to Stu Det Arty Sch, Ft Sill, Okla.
- Keevan, E. F., to Office of Secty of Defense, Wash, DC.
- Kelley, T. E., to First Army 1201st ASU, Ft Jay, NY.
- Kennedy, W. D., Jr., to Stu Det Arty Sch, Ft Sill, Okla.
- King, J. B., to Stu Det Arty Sch, Ft Sill, Okla.
- Kirkwood, W. V., to First Army 1262d ASU, Ft Dix, NJ.
- Kissam, R. V., to Stu Det Arty Sch, Ft Sill, Okla.
- Kolesar, A. M., to Stu Det Arty Sch, Ft Sill, Okla.
- Koop, J. L., to TRUST, Trieste.
- Langstaff, J. D., to AFSWP, Sandia Base, Albuquerque, N Mex.
- Lipscomb, I. H., Jr., to Third Army 3262d ASU ROTC Fla A&M College, Tallahassee, Fla.
- Lochrie, W. R., to Stu Det Arty Sch, Ft Sill, Okla.
- McCarthy, P. N., to AA and GM Br Arty Sch, Ft Bliss, Tex.
- McCravey, J. L., to Stu Det Arty Sch, Ft Sill, Okla.
- McKenna, J. J., to Stu Det Arty Sch, Ft Sill, Okla.
- McMahon, J. F., to 9th Inf Div, Ft Dix, NJ.
- McManus, V. J., to Sixth Army 6513th ASU Calif NG Instr Gp, Long Beach, Calif.
- Malsam, W. R., to Fourth Army 4302d ASU La NG Instr Gp, Bogalusa, La.
- Mariconda, A. F., to Stu Det Arty Sch, Ft Sill, Okla.
- Marshall, J. E., Jr., to Stu Det Arty Sch, Ft Sill, Okla.
- Marx, G. H., to Stu Det Arty Sch, Ft Sill, Okla.
- Moore, H. E., to 35th AAA Brig, Ft Meade, Md.
- Moore, G. M., to Stu Det CIC Cen, Cp Holabird, Md.
- Myers, W. R., to Stu Det Arty Sch, Ft Sill, Okla.
- Nettles, E. W., to Second Army 2502d ASU Pa NG Instr Det, Allentown, Pa.
- Newman, J. W., to Stu Det Arty Sch, Ft Sill, Okla.
- Pashley, W. A., Jr., to Stu Det Arty Sch, Ft Sill, Okla.
- Patterson, F., to 3d AAA AW Bn, Ft Benning, Ga.
- Pavick, P. D., to Stu Det Arty Sch, Ft Sill, Okla.
- Pickens, R. G., to Stu Det Arty Sch, Ft Sill, Okla.
- Plowman, H. B., to 31st AAA Brig, Ft Lewis, Wash.
- Powers, E. N., to Hq ASA Pacific, Tokyo, Japan.
- Ream, E. A., to 31st AAA Brig, Ft Lewis, Wash.
- Redheffer, G. E., to First Army 1242d ASU NY NG Instr Gp, NY, NY.
- Rich, H. H., to 4052d ASU AAA and GM Cen, Ft Bliss, Tex.
- Roe, W. L., to Stu Det Arty Sch, Ft Sill, Okla.
- Rodgers, V. L., to Hq ASA Europe, Frankfurt, Germany.
- Rogers, M. A., to Stu Det CGSC, Ft Leavenworth, Kans.
- Routh, R. K., to Stu Det Arty Sch, Ft Sill, Okla.
- Rowe, G. W., to AFSWP, Sandia Base, Albuquerque, N Mex.
- Rutherford, R. D., to AA and GM Br Arty Sch, Ft Bliss, Tex.
- Schockley, J. W., to Stu Det Arty Sch, Ft Sill, Okla.
- Scott, J. W., to Stu Det Army Lang Sch, Monterey, Calif.
- Semmens, C. P., to Stu Det Arty Sch, Ft Sill, Okla.
- Semmens, G. L., to Stu Det Arty Sch, Ft Sill, Okla.
- Simon, D. E., to Stu Det Arty Sch, Ft Sill, Okla.
- Sims, L. H., Jr., to Stu Det Arty Sch, Ft Sill, Okla.
- Sisak, J. G., to Stu Det Arty Sch, Ft Sill, Okla.
- Smith, W. J., to Stu Det Arty Sch, Ft Sill, Okla.
- Soler, E. M., to AA and GM Br Arty Sch, Ft Bliss, Tex.
- Spalding, B. D., Jr., to Stu Det Arty Sch, Ft Sill, Okla.
- Stewart, L. F., to Stu Det Arty Sch, Ft Sill, Okla.
- Stigers, J. W., to Stu Det Hq Second Army, Univ of Pa, Phila, Pa.
- Sydney, W. D., Jr., to Stu Det Hq Second Army, Univ of Pa, Phila, Pa.
- Thaxton, H. C., to Stu Det Arty Sch, Ft Sill, Okla.
- Venters, A. L., to Staff and Faculty CIC Cen, Cp Holabird, Md.
- Via, H. F., to Stu Det Arty Sch, Ft Sill, Okla.
- Waggaman, R. O., to First Army 1170th ASU, Ft Devens, Mass.
- Waugh, E. S., to 35th AAA Brig, Ft Meade, Md.
- White, G. O., to Stu Det Arty Sch, Ft Sill, Okla.
- Wilkinson, R., Jr., to Stu Det Arty Sch, Ft Sill, Okla.
- Willis, J. P., to 5th AAA AW Bn, Ft Sheridan, Ill.
- Wilson, D. J., to 109th CIC Det Second Army, Cleveland, Ohio.
- Wood, F., to Stu Det Arty Sch, Ft Sill, Okla.
- Woods, J. R., to AA and GM Br Arty Sch, Ft Bliss, Tex.
- Woodward, J. G., to 31st AAA Brig, Ft Lewis, Wash.
- Wyatt, W. L., to 31st AAA Brig, Ft Lewis, Wash.
- Furman, H. W., to Stu Det Arty Sch, Ft Sill, Okla.
- Godfrey, H. J., to Stu Det Arty Sch, Ft Sill, Okla.
- Hamberger, H. F., to 35th AAA Brig, Ft Meade, Md.
- Hannon, L., to Stu Det Army Lang Sch, Monterey, Calif.
- Heaser, W. J., to Stu Det Arty Sch, Ft Sill, Okla.
- Hemenway, H. W., to Stu Det AA and GM Br Arty Sch, Ft Bliss, Tex.
- Hirsch, T. V., to Hq Second Army, Carlisle Bks, Pa.
- Inskeep, J. H., to AFSWP, Sandia Base, Albuquerque, N Mex.
- Jovanovich, B. U., to Far East Comd, Yokohama, Japan.
- Latimer, H. D., to Stu Det Arty Sch, Ft Sill, Okla.
- LeVan, C. J., to Stu Det Arty Sch, Ft Sill, Okla.
- Lowell, J. C., to Stu Det Army Lang Sch, Monterey, Calif.
- McCracken, B. O., to Stu Det Arty Sch, Ft Sill, Okla.
- McKinley, M. H., to Stu Det ASA Sch, Carlisle Bks, Pa.
- Martin, J. B., Jr., to Stu Det Arty Sch, Ft Sill, Okla.
- Martin, J. C., to Second Army 2101st ASU, Ft Meade, Md.
- Mendenall, C. H., to AFSWP, Sandia Base, Albuquerque, N Mex.
- Mendenhall, F. E., Jr., to 22d AAA Gp, Ft Custer, Mich.
- O'Donnell, N. J., to Stu Det Arty Sch, Ft Sill, Okla.
- Osgood, B. R., to 4th AAA AW Bn, Ft Meade, Md.
- Parker, F. C., to Stu Det Arty Sch, Ft Sill, Okla.
- Peters, H. T., to 35th AAA Brig, Ft Meade, Md.
- Pitzer, H. S., Jr., to AFSWP, Sandia Base, Albuquerque, N Mex.
- Portera, J. J., to 112th CIC Det Fourth Army, Albuquerque, N Mex.
- Palmatier, F. M., to AFSWP, Sandia Base, Albuquerque, N Mex.
- Price, J. E., to US Army Alaska, Ft Richardson, Alaska.
- Rasmussen, J. A., to Stu Det Arty Sch, Ft Sill, Okla.
- Reidy, W. J., to Stu Det Arty Sch, Ft Sill, Okla.
- Rhodes, E. T., to 3d AAA AW Bn, Ft Benning, Ga.
- Skinner, D. L., to Stu Det Army Lang Sch, Monterey, Calif.
- Solari, J. M., to Far East Comd, Yokohama, Japan.
- Stogner, H. D., to Stu Det Arty Sch, Ft Sill, Okla.
- Stuckey, J. W., to Stu Det Arty Sch, Ft Sill, Okla.
- Sweers, P. C., Jr., to Stu Det Arty Sch, Ft Sill, Okla.
- Thomas, C. R., to Stu Det AA and Gm Br Arty Sch, Ft Bliss, Tex.
- Tongue, R. C., to 22d AAA Gp, Ft Custer, Mich.
- Wood, R. L., to Stu Det Arty Sch, Ft Sill, Okla.
- Yaggi, A. S., to 82d Abn Div, Ft Bragg, NC.

SECOND LIEUTENANTS

- Beam, R. L., to Stu Det ASA Sch, Carlisle Bks, Pa.
- Felder, P. L., to 3d AAA AW Bn, Ft Benning, Ga.
- Fujimoto, Y., to Far East Comd, Yokohama, Japan.
- Hill, W. S., to Stu Det ASA Sch, Carlisle Bks, Pa.
- Mott, H. A., to Far East Comd, Yokohama, Japan.
- Nishimoto, A. K., to Far East Comd, Yokohama, Japan.
- Rhodes, A. L., to Far East Comd, Yokohama, Japan.
- Smith, J. A., to 9th Inf Div, Ft Dix, NJ.
- Turner, E., to Stu Det ASA Sch, Carlisle Bks, Pa.
- Walter, E. P., to 3d AAA AW Bn, Ft Benning, Ga.
- Williams, H. G., to Stu Det AA and GM Br Arty Sch, Ft Bliss, Tex.

FIRST LIEUTENANTS

- Ashton, S. S., to 35th AAA Brig, Ft Meade, Md.
- Bacon, R. H., Jr., to AFSWP, Sandia Base, Albuquerque, N Mex.
- Bezhik, V. W., to Stu Det Arty Sch, Ft Sill, Okla.
- Calkin, G. R., to Fifth Army 5205th ASU, Iron Mt, Mich.
- Canellos, P. J., to 525th MI Svc, Ft Bragg, NC.
- Cotton, J. V., to Stu Det CIC Cen, Cp Holabird, Md.
- Dolan, T. M., to 22d AAA Gp, Ft Custer, Mich.
- Doyle, A. L., to Stu Det Arty Sch, Ft Sill, Okla.
- Ebel, H. N., to First Army 1170th ASU, Ft Devens, Mich.
- Elliot, H. W., to Stu Det QM Sch, Cp Lee, Va.
- Fischer, K. P., to 35th AAA Brig, Ft Meade, Md.
- Flint, B. P., Jr., to Stu Det Arty Sch, Ft Sill, Okla.

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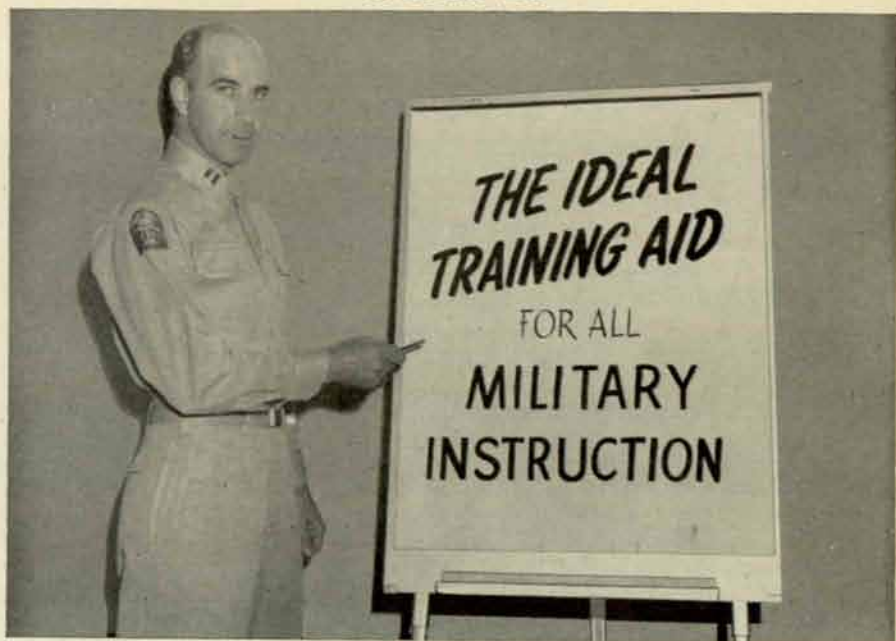
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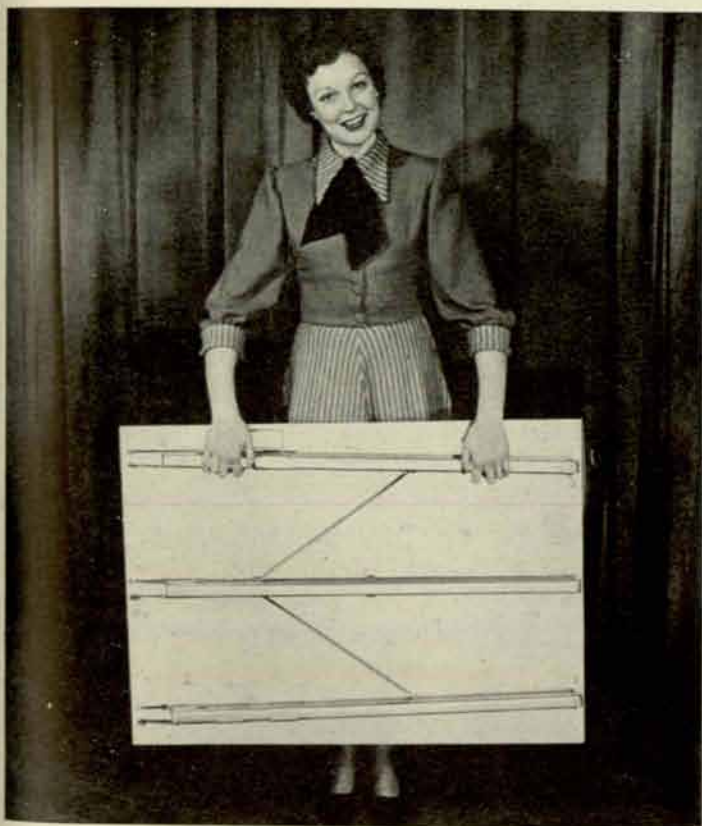
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